SKYWAYS

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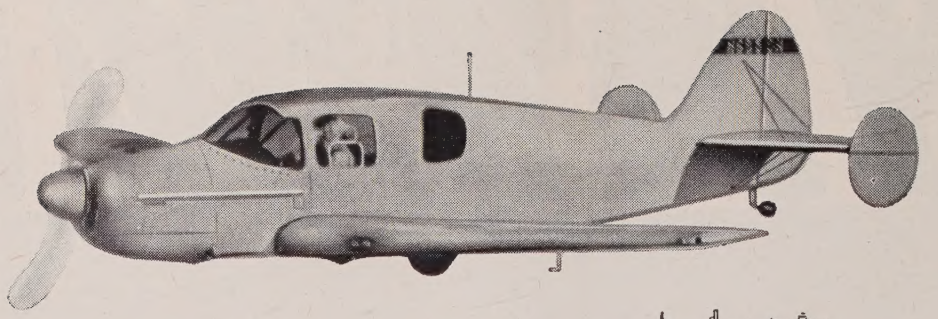
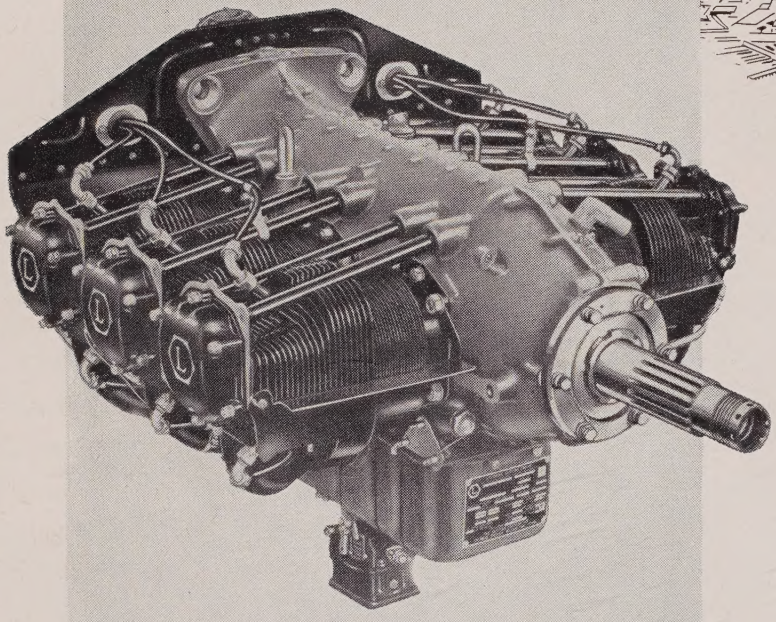
t's Report...the Wee Bee, page 14





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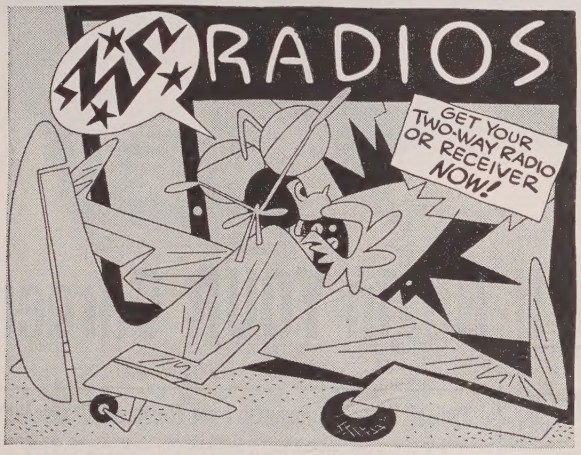
If you think that statuesque blonde in the airport eatery is a fickle number, how about that unpredictable little charmer they call "Weather"?

Who knows the number of promising young pilots she's



lured aloft with her sunny smile, only to make with that "wind and rain in her hair" routine!

That's why, and this is for the record, we want to encourage the use of communications equipment in today's putt-putts. That dame "Weather" likes nothing better than to give you a bum steer!

And . . . unless you're one of those rare fly-boys who's on to her shenanigans, two-way radio will keep you up-to-date on her changes of mind.

Two-way radio, or even just a receiver, will keep you posted via the Weather Bureau's vast facilities. You'll fly safer—using the same data as commercial pilots use.

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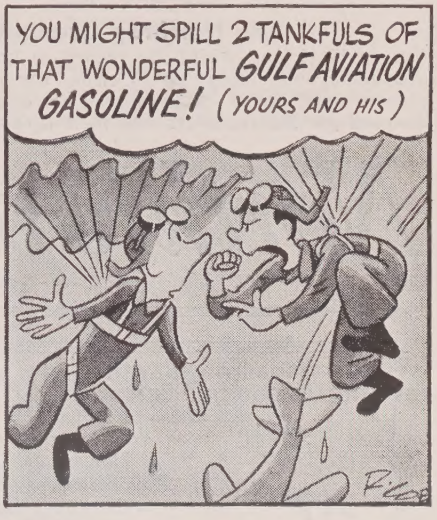

Gulf Oil Corporation . . . Gulf Refining Company

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How will you "Stack Up?" With a background like this, how do you think you will stack up against men who are just "looking for a job"? Which of you will get the position with Security, Good Pay, and Interesting Work? You know yourself what the answer is. If you want *proof*—here it is!

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lists in black-and-white the record of hundreds of recent NORTHROP *graduates now beginning to enjoy the rich rewards of an aviation career. Send for a copy today—it's amazing proof of the constant demand for* NORTHROP*-trained men throughout the Aviation Industry.*

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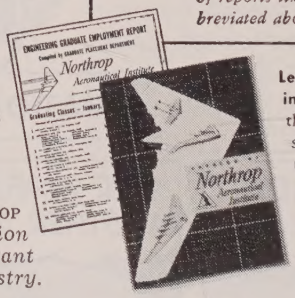
Robert B. now is FLIGHT TEST ANALYST
Eugene A. now is RESEARCH ANALYST
Joseph P. now is WIND TUNNEL OPERATOR

**The NAI Graduate Placement Dept. has hundreds of reports like these from graduates. Names are abbreviated above out of respect for personal privacy.*



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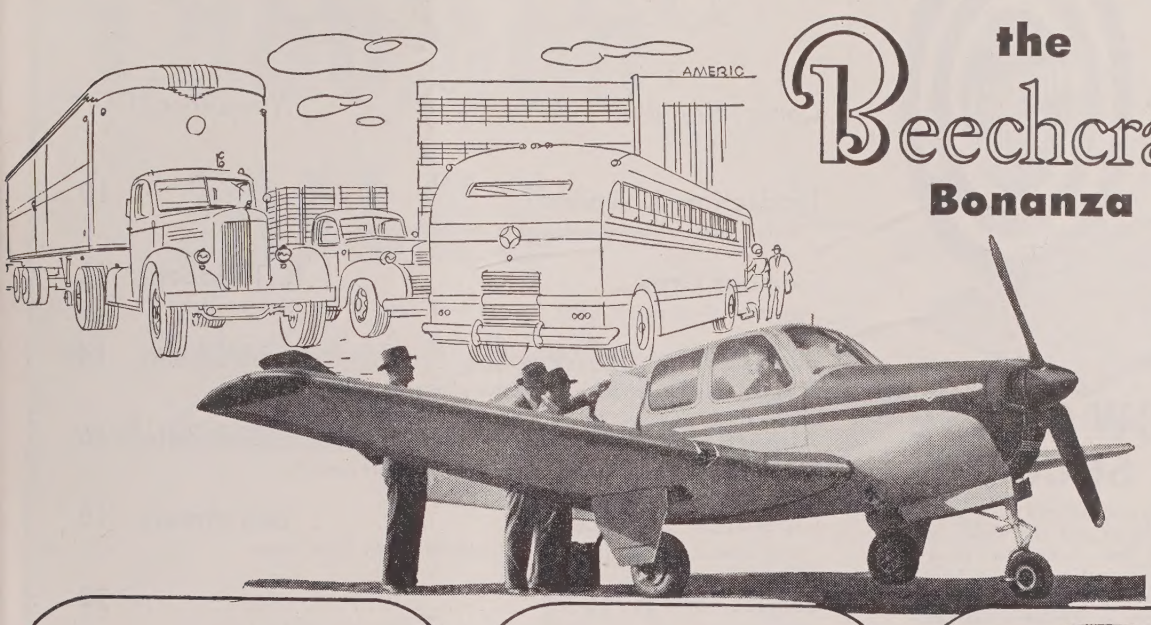
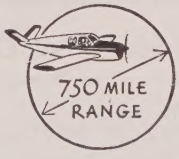
Check one: ☐ VETERAN ☐ NON-VETERAN

Add this "expediter" to your transportation set-up:

the Beechcraft Bonanza

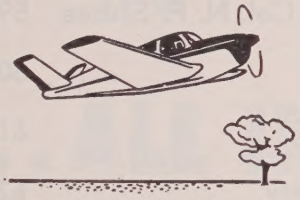


Faster trips. Cruising at a 170-mph clip, your management men can spend *all* the time they need on "field work." You have complete mobility of action—the Bonanza is fully equipped for day and night flights.



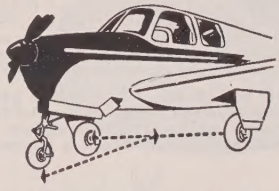
. . . at *longer* range! 750-mile range can be lengthened to 940 or 1,145 miles with installation of 10- or 20-gallon auxiliary fuel tanks. In the Bonanza you can *keep moving* to your destination.

Travel in style—and comfort! The cabin is *soundproofed*, handsomely tailored, and *big*. Four ride in "stretch-out" comfort. W-I-D-E limousine-type door. Arm rests, ash trays for all. Three map pockets.



Takes short fields "in stride." Take-off horsepower rating now 196 h.p. at 2,450 rpm. Landing gear lowered in 7½ seconds, raised in 8½, at 105 mph. New Beechcraft propeller develops greater static thrust.

And just compare this economy! Fuel consumed at "passenger car" rate — 9.5 gallons per hour! Bonanza uses only 56% of engine's rated take-off horsepower at cruising speed. Less wear, fewer overhauls!



Unsurpassed *safety.* Steerable nose-wheel gives greater maneuverability, more positive control. Wide and long wheel base smooths rough field landings. All-metal framework far surpasses CAA requirements.

Features like these have put the Model B35 Beechcraft Bonanza 'way out in front! Get the *full* story about this sturdy, economical business plane from your nearest Beechcraft distributor or dealer today. Or write Beech Aircraft Corporation, Wichita, Kansas, U. S. A., on your company letterhead.

Top speed, 184 mph
Cruising speed, 170 mph
Range, 750 miles
Fuel economy, 9.5 gph

Beechcraft
BONANZA

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

SKYWAYS

Cover: Republic F-84 *November, 1950*

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But here are two additional facts you should know:

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ALSO SEE: The Cessna 140—2 place. All-Metal. Fast—quiet—economical. Many business uses. Saves weeks of traveltime. **The Cessna 170**—lowest-priced, 4-place, all-metal plane on market . . . by several thousand dollars.

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LOCKHEED'S F-94-C... TIMED FOR DEFENSE

LIKE MANY ANOTHER U. S. weapon for defense these days, the Air Force's new Lockheed jet fighter, the F-94-C, is too good to be talked about. You'll know this plane by the thrust of its speed, the sound of its power, and its purple-blue exhaust as it streaks through the night or through the roughest weather.

But beyond this physical impact of the new F-94-C thin-wing Jet, there is not much you can know about the airplane. It has more of everything—versatility, maneuverability, stability, etc. —but it's so good it's secret.

IT TOOK MORE TIME, more skill and more ingenuity to build the F-94-C than its distant World War II cousins. Good as they were, World War II airplanes were not the complicated package of speed, electronic intelligence and firepower found in the F-94-C. Nor did they require the years and years spent in the development of men, machines and materials now needed to build an airplane for defense.

It takes more and more time and planning to build an airplane, and the F-94-C was timed years ago—by Air Force and Lockheed engineers—for today's defense.

AIR YOUR VIEWS

Plane Info

Gentlemen:

I would like some information concerning the two-motored craft being tested and worked on by the Aero Designing and Engineering Corporation in Culver, Calif. Also, I have heard about Martin having in production 2-0-2's, 3-0-3's and 4-0-4's. How many such designated Martin aircraft are there?

DONALD B. VICTOR

Beverly Hills, Calif.

The twin-engine plane you probably are referring to is the Aero Commander, *a high-wing light transport powered by two Lycoming engines. This airplane has been under development for some time and, according to reports, is a worthwhile project. It is built to accommodate six or seven, including pilot and copilot, and is of all-metal construction. It is said to cruise at 175 mph on 75 per cent of power, and to have a range of 850 miles. The Martin 2-0-2 is in service with a number of U.S. domestic air lines. The 4-0-4 is a development of the 2-0-2 and combines higher payload and improved passenger comfort with the operation-proved features of the 2-0-2. Your editor has been told that the Massachusetts Institute of Technology is experimenting with the 4-0-4 design as a propjet plane. I don't believe the 3-0-3 ever was built. The only other Martin ships are military.*—ED.

Never-Ending BT

Gentlemen:

I would like to get into this argument on BT-13's. I trained in them, spun them under the hood, flew day and night XC's in them, and was head of Flight Maintenance on a field that had them. If we had a "13" that wouldn't cruise at 140 mph, we used to check the static pitot tube and line because it would have to be plugged or there would be moisture in it. In fact, we had a number of them collect moisture and would only indicate 115 mph straight and level. I suggest the owners of "slow" planes clean out the lines and check over a measured course.

Some pilots used to prefer the BT to the AT-6 for XC's because they didn't have to land for gas as often.

DONALD J. STROUT

Oakland, Maine

Your side of the argument, Mr. Strout, is definitely winning. In fact the mail is so stacked against our Air Force man who started the whole thing that he has an inferiority complex and has given up beating his chest and flexing his muscles. Instead he sits at his desk and pores over a dog-eared BT-13 manual.—ED.

Flying Saucers

. . . I've seen three flying saucers since I last wrote you and for the past month they have been almost daily phenomena over the Rocky Mountain west. Literally thousands of reports have been made to newspapers and police and not one word of it has been printed or carried out—*except* that our most ambitious disk of all came whizzing south over Fairbanks, Alaska about a week ago and was promptly labeled a guided missile by army propagandists. A little tour it made the Saturday evening before, all over the west, was completely ignored, except that four days later a L. A. wire dateline stated that a DC-6 crew and 50 passengers saw what they thought was a flying saucer at 9 P.M. Saturday when they followed it for about 10 minutes on a let-down into Las Vegas. The story inferred that this was the only sighting. Yet, motorists by the hundreds stampeded Las Vegas police headquarters to report it, and it was the subject of another of the futile fighter sorties that never seem to even get within rocket distance no matter how hard they try. It went straight up someplace far west of Pioche, Nevada, and at a very high altitude it laid down a big circular smoke ring some 75 miles or so in diameter. This took about 55 seconds. It was very dark on the ground at Cedar City, where I happened to be at the time, and this smoke or vapor trail was in bright clear sunlight far to the west and at 25° above the horizon. It was seen, then, by people I know and from whom I have interviews, from Las Vegas, St. George, Cedar, Enterprise, Delta, Salt Lake, Ogden, Burley, Twin Falls, Sacramento, Inyokern and Blythe. Really a spectacular sight!

Not fewer than thousands of people saw it and yet the only story that finally got out four days later inferred that the DC-6 crew's yarn was unsupported.

Taylor's story in the *Reader's Digest* is pure bunk if you care for my opinion. The Bruce Bliven yarn in *Look*, saying the exact opposite, is of the same material. Bliven takes authorship to convince people that 50 per cent of their country cousins are crazy, and the *Digest* takes on an opposing set of "facts" to be fed to the people who have now seen flying saucers everyplace in the country.

The scientists are furious. Information has been refused them, too . . . *not* military security refusals. Information on the data picked up by Palomar on the things they are calling space ships that are tracking us around our natural orbit. General information of all kinds. And, apparently, all valid photos of saucers are still being confiscated no matter how much prestige and scientific standing any group of individuals might have in the nation at large.

I watched two of them sit relatively motionless for half an hour one evening at about 12,500 feet along the Wasatch range, and saw a single circling Cedar City a month before the night show two weeks ago. Last week two of them tracked a B-36 on a radar run for 40 miles along Salt Lake Valley. They were much higher, and at least twice as big around as the B-36 is in wing span. Also, despite being higher, they were running circles around the B-36's course.

It must be frustrating for the AF photographers to be shooting pix all the time with long-barreled cameras and then never getting to even look at the negatives after they have been taken over for processing and top secret classification.

Oh well, it was news three years ago. Half the people I know have seen them now, the other half being indoor workers who don't get out much, and thus have less chance. But it's damned annoying, especially when magazines with the circulation of the *Digest* and *Look* print the stuff they have on hand at this time.

Some of the pilots I know in the northwest feel that although the big constructions are likely to be space craft, what looks like small "disks" flying around might be life form itself.

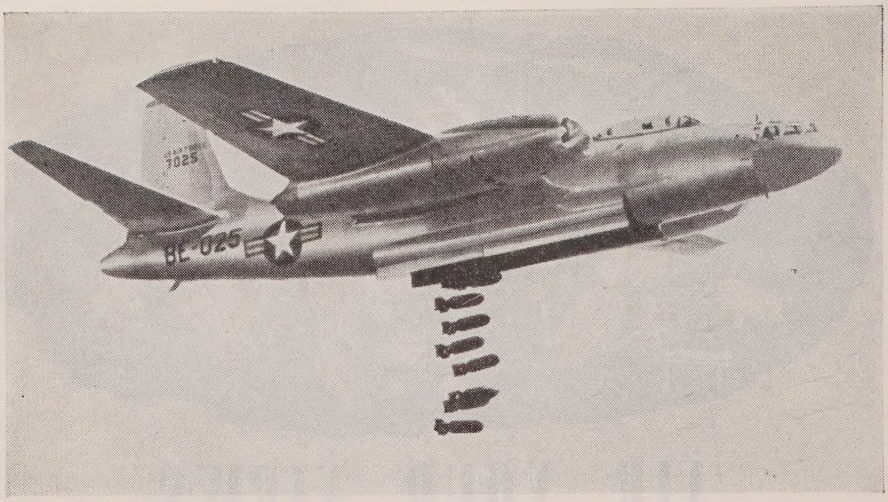
In the serious opinion of one outstanding physicist, perhaps even an inorganic form of intelligence and life. It must be admitted that one of the three types does have the appearance of swimming, rather than flying. This is the slower of the forms, too. The kind that is seldom tracked over 1700 mph on radar and quite often is cruising around as low as 500.

BOB ARENTZ

Salt Lake City, Utah

Bob Arentz is one of SKYWAYS' best-known and best-liked pilot-authors. He's a temperate fellow, not given to hallucinations. Consider author Arentz's remarks . . . and write us your opinions. If you've seen any saucers, write us about it. We want to hear your opinions and your experiences in this saucer business.—ED.

(*Continued on page 52*)



BOMBING TEST run with an Air Force B-45 *Tornado* jet bomber proved heavy bombs could be dropped accurately at speeds over 500 mph. Here a "stick" of 500 pounders go down

MILITARY AVIATION

Blue Angels

The Navy's famed jet flight-exhibition team, the "Blue Angels," has been ordered to a combat ready status. The group will be assigned to fleet operations as an organized combat squadron, and it will retain the name "Blue Angels." The boys will take along their J-42 powered Grumman *Panthers* that they have flown to aerobatic fame at exhibitions throughout the country. The current team is led by Lt. Cmdr. John J. Magda, and consists of seven pilots and two dozen of the Navy's most experienced jet maintenance men.

Hawker in Australia

Britain's newest "hush-hush" jet fighter, the sweptwing Hawker P1081, is going to be built in Australia, according to a recent announcement by the Hawker Siddeley Group in London. The P1081 is a development of the Hawker P1052 and it flew for the first time in June, 1950. Powered by a Rolls Royce *Nene* turbojet engine, the P1081 is claimed to be the "world's fastest fighter."

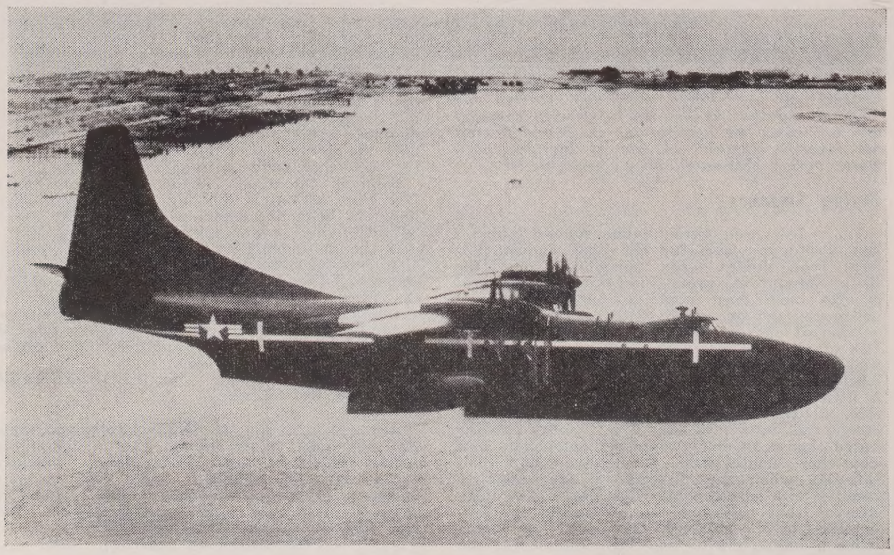
SA-16 Save

The Air Rescue Service in operation in Korea recorded its first "save" with the Grumman SA-16 amphibian. The SA-16 is the first plane to have been specifically procured for air search and rescue activity within the Air Force by the U.S. Navy. Appropriately enough, the first man to be picked up was a Navy pilot who had bailed out into the water at an undisclosed position near Korea. The SA-16 is so new to the Air Force that prior to the outbreak of hostilities in the Far East, none had been ferried to the Air Rescue Squadrons.

First Flight

One of the USAF's most revolutionary planes, the Fairchild XC-120 (*see October, SKYWAYS*) with its detachable fuselage, made its first flight recently. Flying with its cargo-carrying pod attached to the "mother plane," the new ship was aloft for 45 minutes. According to its pilot, Richard A. Henson, "the plane handles much like the C-119 in the air."

CONVAIR XP5Y-1, a Navy patrol seaplane, recently established a new endurance record for turboprop aircraft. The Navy's giant flying boat was in the air more than eight hours



Piper Contract

The USAF has awarded a contract to Piper Aircraft Corporation to build a quantity of L-18-C liaison aircraft. It is understood that the Piper L-18-C's will be shipped overseas as part of the foreign arms aid program. The plane is a military version of the Piper *Super Cub.*

Ryan Orders

The largest single order since World War II recently was received by Ryan Aeronautical. This order brings to over $10,000,000 the new contracts received in July. Under this new contract (with Boeing), Ryan will increase its production of the huge aft fuselage sections for the Air Force's giant C-97 *Stratocruiser* military transports.

Marlin Orders

The U.S. Navy recently placed a substantial order (the second in two weeks) for Martin P5M-1 *Marlin* anti-submarine seaplanes. Designed especially for searching out and killing the underwater sea raiders, the *Marlin* is a successor to the PBM *Mariner* series of World War II. It is powered by two Wright 3350-30 compound engines rated at 3,250 hp. Props are four-bladed, square-tipped Hamilton Standards.

Heavy Bomb Drop

In tests with the jet B-45 *Tornado* bomber, the Air Force has safely and accurately dropped heavy bombs for the first time at speeds over 500 mph. Prior to these tests, the highest speeds at which bombs had been dropped successfully from an operation airplane were the 350 to 400 mph standards of World War II.

The high-speed runs with heavy missiles were made with bombs weighing from 500 to 4,000 pounds, and at varying altitudes up to more than 20,000 feet. The North American B-45 jet bomber will carry over 10 tons of bombs at a service ceiling of over 40,000 feet. Its combat radius of over 800 miles can be extended by use of external drop tanks.

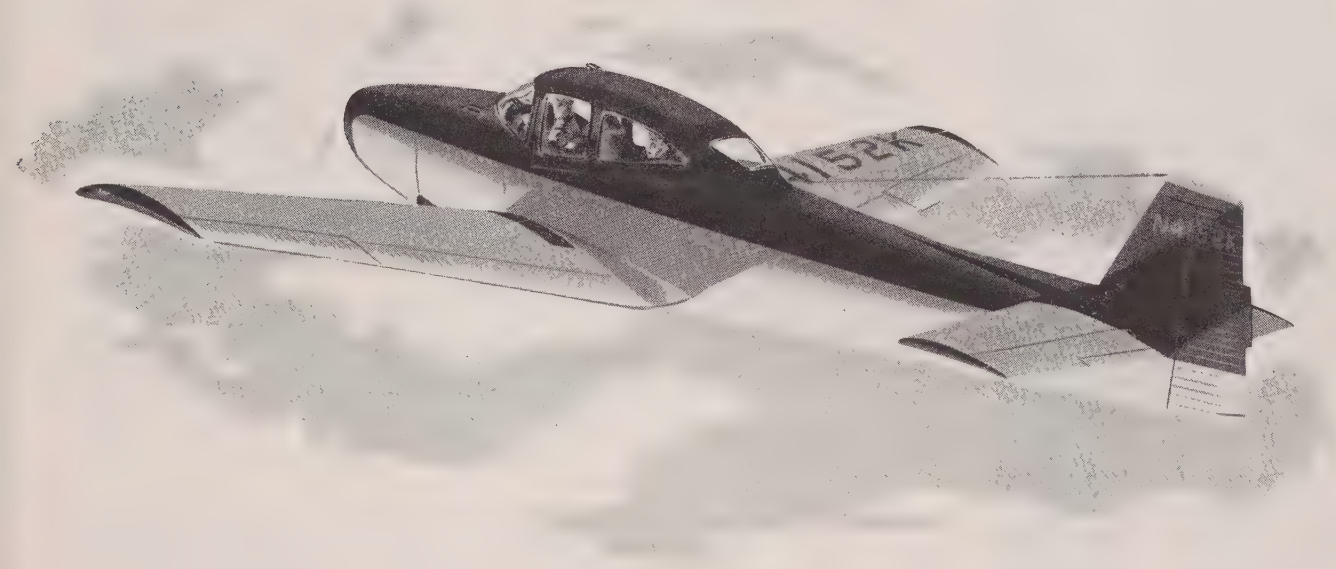
Turboprop Record

Convair's XP5Y-1 Navy patrol seaplane has established a new American and world flight endurance record for turboprop aircraft. The huge 60-ton flying boat was in the air eight hours and six minutes on a recent routine test flight.

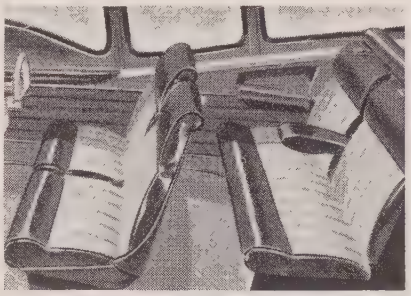
Largest Prop

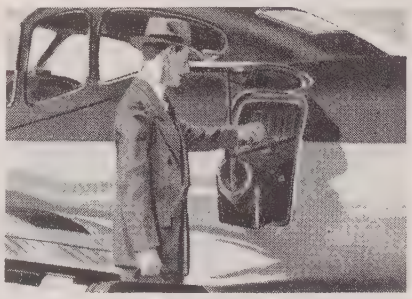
The world's largest and most powerful aircraft propeller has been delivered to the Air Materiel Command at Wright Field. Called the "Octoprop," it is an eight-bladed giant over 19 feet in diameter, designed and built by the Propeller Division of Curtiss-Wright Corporation, Caldwell, New Jersey. A dual-rotation type, the new prop was designed for use with gas turbine engines of 10,000 to 15,000 horsepower.

NOW...*The Better-than-Ever* SUPER 260 NAVION *for '51*



Want the performance thrill of your life? Fly the new, better-than-ever Super 260 *Navion* for 1951! Feel the surging power of the 260-hp Lycoming engine... relax while the *exclusive* inter-connected control system practically flies the 170-mph *Navion* for you. Yes, flying's more fun in the new Super 260 *Navion*. It outcruises, outclimbs, yet lands shorter than other planes in its class. And, for '51—look at these brand new features:





- **NEW...** *More Beautiful Interior Styling*

  Luxurious interiors styled by Charles of California. Beautiful, harmonious colors and fabrics with generous leather trim. Upholstery is extra-thick foam rubber. And the new "reverse flow" ventilating system brings plenty of bracing fresh air into the comfortable, roomy cabin.

- **NEW...** *Exterior Baggage Door*

  The new *Navion Luggage Master* makes baggage a cinch to load and unload. No need to climb in and out of plane while loading... do it all from the outside. Luggage Master is equipped with a sturdy lock for complete protection. Folding rear seat affords easy access to baggage in flight.

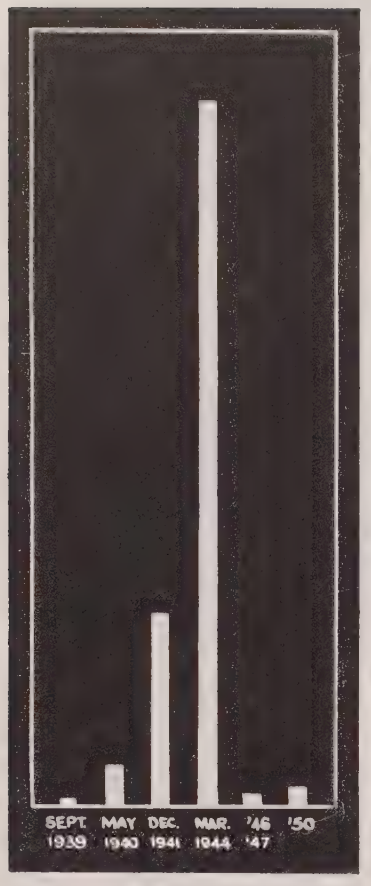
- **NEW...** All metal selective pitch Hartzell propeller... push-button starter on the dash board... beautiful, new two-tone exterior enamel finishes... sun-visors and curtains for pilot and passengers.

Ryan Navion

NO OTHER PLANE COMBINES SO MANY FEATURES SO WELL

Rely on Ryan RYAN AERONAUTICAL COMPANY, 211 LINDBERGH FIELD, SAN DIEGO, CALIFORNIA

PRODUCTION UNLIMITED?



Monthly Military Plane Production Rate

AT THE time of writing, our battle fortunes in Korea are decidedly lacking. If nothing else, the Korean affair has proved questionable planning and procurement on the part of the Department of Defense. One fact is coldly certain: we stand today in practically the same position we occupied back in 1939, '40 and '41.

In September, 1939, when Hitler's forces invaded Poland, the monthly military aircraft production rate was 117 planes. Eight months later President Roosevelt, in a speech before the Congress of the United States, called for the production of 50,000 aircraft per year. At that time 104,066 workers were employed in an aircraft industry that was turning out military planes at the rate of some 450 per month.

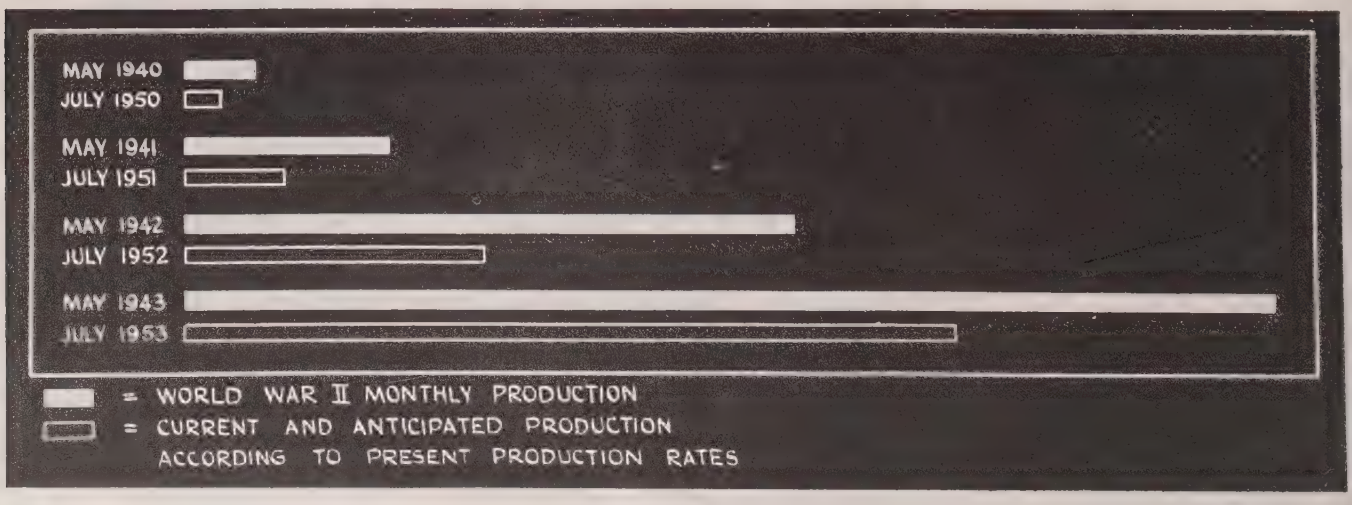
In December, 1941, when the Japanese attacked Pearl Harbor and made a shambles of our "invulnerable" base, 423,027 men and women were employed within the industry, and the plane production rate went up to 2,461 a month. It took three years, however, for this rate to climb to its wartime peak—in March, 1944, some 9,113 warplanes were coming off production lines manned by 1,326,345 workers in the plane plants throughout this country.

Then came the end of the war and the skids for the aircraft industry that had won the battle, production-wise. Despite predictions and warnings that we might enjoy only 10 years of peace, no more, the aircraft industry at the close of the war was allowed to disintegrate, and total employment fell to a mere 180,000. These few turned out, as an average for 1946 and '47, about 130 military aircraft per month.

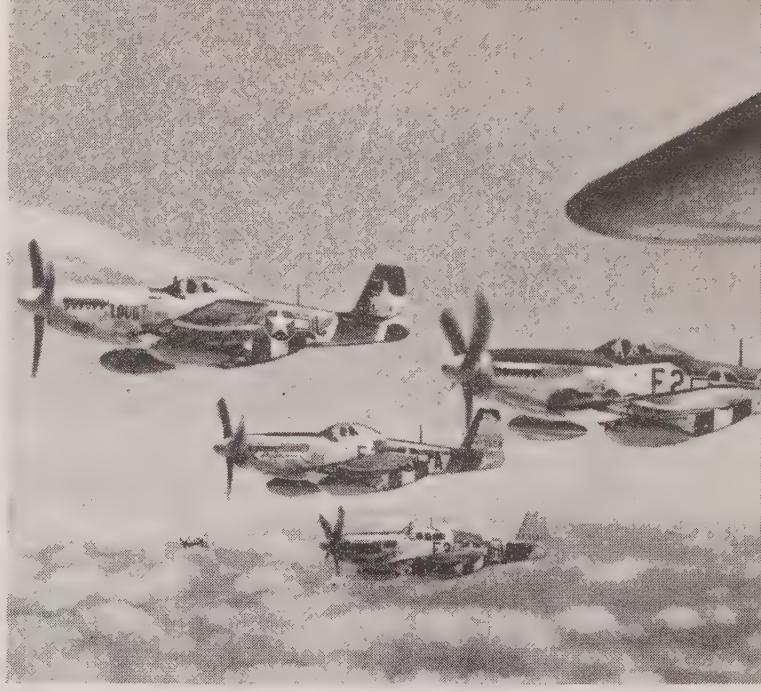
It was only after months of pressure stemming from the Cold War that this rate began to increase and finally, as of today, reach approximately 215 planes per month. Aircraft industry employment, in the meantime, increased by some 45,000—from 180,000 to 225,000.

The 70-Group Air Force, set up on paper as the minimum peacetime requirement, is not today an Air Force in being. While the USAF has the legal right to operate 70 Groups, the money for this operation had not, at time of writing, been appropriated. To provide a 70-Group AF, with 27 Nat'l Guard Squadrons and 8,100 Reserve aircraft, as sought by the Finletter Commission, $3,200,000,000 would be needed annually for aircraft procurement. The cost of an Air Force Group varies from $60,000,000 to $100,000,000, depending on the type of aircraft. A single B-36, for example, costs about

Comparative Monthly Production



RADAR-EQUIPPED F-94's have begun rolling from the assembly lines at Lockheed's Burbank, California factories



GROUND-SUPPORT FIGHTERS, the old World War II F-51 *Mustangs* are replacing jets in Korea for low-level attack

$4,000,000—and there are 30 in each Group.

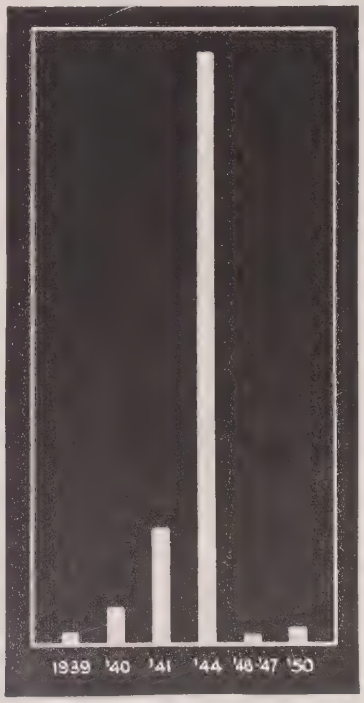
Defense Secretary Johnson slashed here and there in a money-saving gesture when he took over the job from the late James V. Forrestal, and he reduced U. S. military air power to 48 Groups and, at one time, even considered a reduction to as low as 30 Groups. Tactical air power was sacrificed in favor of strategic. Long-range bombers and escort fighters were ordered, while tactical aircraft such as ground-support fighters were practically ignored.

What could prove to be of even greater importance in the winning or losing of any future conflict is the availability of transport planes. Many a military mind is of the opinion that our biggest "stick" to wave in the face of any overly ambitious power would be a quantity of transports capable of flying troops to any spot on earth in relatively few hours. Thus far in Washington planning the military air transport has been a neglected factor. In 1947, we had a total of 279 military air transport planes. In 1948, we had 263; and in 1949 we totaled 166 military transports. Under existing contracts, only three transports are in production: Boeing C-97's, Douglas C-124's, and Northrop C-125's, and by present standards "quantity" is not part of the order.

The Korean action is expected to force a revision of thinking and planning by the administrative top brass, but can the U. S. aircraft industry fill the gap in the time that may be left to us? Increased orders *may* come through as the result of the present conflict. Forecasters look for

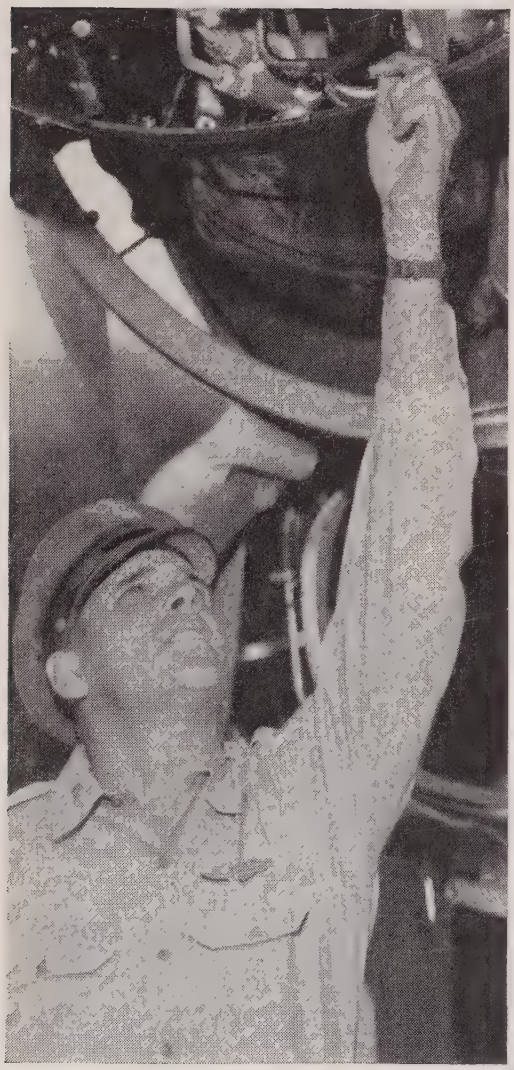
(*Continued on page 41*)

Annual Military Aircraft Production (Number of Planes)



DOUGLAS AD'S are coming off the lines at Douglas' El Segundo factory. This is one of the latest planes specifically designed for ground-support operations by Air Force

DAY AND NIGHT, four-engines B-50's lay a fine web of vapor trails in the thin air of extreme altitude on flights to arctic wastes, deserts



AIRPLANE COMMANDER of the B-50 "Miss Ingear" is Capt. Jack O'Reagan, here checking drain fitting on No. 4

Combat Crew

By R. T. SACOPI

"THE *combat crew has grown tremendously in military importance since World War II. With the advent of atomic weapons, one crew and one airplane can now destroy an objective which would require hundreds of planes using conventional weapons. We, therefore, devote much attention in SAC (Strategic Air Command) to the selection of airplane commanders and to intensive training of individual combat crews.*"—Brig. Gen. John B. Montgomery, director of operations, Strategic Air Command.

If you were a casual visitor to the ready room of any one of the Strategic Air Command's far-flung bases, you might hear something like this. "Okay, Mac, round up the crew we're going to knock off a few thousand." The chances are an airplane commander has just been assigned a mission and he's talking about nautical miles, brother, not feet!

There is probably no other group of men in the world with a more complete downright disregard of space, distance and the elements than the 11- to 16-man crews of the Strategic Air Command bombers. Day and night, four-engined B-29's and B-50's and six and 10-engined B-36's lay

CREW of Strategic Air Command B-50 lines up for inspection. Men are *(l. to r.)* O'Reagan, Bloodgood, Call, Goede, Boost, Yearsavich, O'Reilly, Ham, Murawski, Emberton, Doherty

a fine web of vapor trails in the thin air of extreme altitude. SAC bombers have. on occasion, drawn a thin white line around the world, and flights to the frozen arctic wastes or the blistering deserts of Arabia are routine. Bad weather or good, SAC bombers bore holes through the sky to distant destinations with a deadly purpose.

Lt. Gen. Curtis E. LeMay, SAC Commander and Strategic Air War Expert, sums it up in a terse statement. "The security of the United States may one day depend on the ability of SAC bomber crews to find and hit targets anywhere at any time."

If practice made perfect, like the saying goes, Strategic Air Command crews would get a bull's-eye every time. But, they are the first to tell you, in long-range bombardment there is no such thing as perfect—there are too many factors to permit perfection. If you practice constantly, you may be fairly good, they think.

PLANE'S radar operator who sees through solid clouds and darkness is Captain Albert T. Boost, here on the scope

The criterion of ability in SAC is navigational and bombing accuracy. A new crew is considered under training until it has demonstrated it can find targets and hit them regularly. Then that crew is considered "Combat Ready." This is the SAC diploma. Once a crew has qualified as "Combat Ready," it has made the "First Team." That doesn't mean the boys can rest on their laurels—they must maintain their proficiency or go back to the bush league.

The most valuable training experience is gained from long over-water and over-arctic flights. These are necessary to insure dependability of crews under conditions of weather and terrain in any part of the globe. Consequently, aircraft are periodically assigned targets in the Caribbean, Hawaii, Europe or Alaska where many a malemute has bayed at a high-flying. pole-bound bomber. Flights to distant targets tend to give the SAC crewmen an unusual conception of the world: To them, the Aurora Borealis and the Southern Cross are just 30 hours (three gallons of coffee and 60 sandwiches) apart. Deserts, mountain ranges, oceans, darkness, ice plateaus or palm studded islands may all pass to the steady drone of engines as the bomber plods thin air to its target. When the navigator warns "target coming up," crewmen tense in combat positions. Scanners sweep the sky for enemy fighters and guns swing in ready arcs. The navi-

(*Continued on page 45*)

Pilot's Report...*the Wee Bee*

WEE BEE is big enough to lift a man, small enough to be lifted by one. This tiny plane weighs a mere 210 pounds

PILOT of the *Wee Bee* assumes prone position to fly the mite. Configuration is conventional, gear is tricycle

By BILL CHANA

Flight Test Engineer, Convair

IT's big enough to lift a man, yet it is small enough to be lifted by one. You fly on it but not in it! That's the *Wee Bee*, a tiny plane you literally put on. It weighs 210 pounds and swings a prop that's four feet from tip to tip.

Considered to be one of the world's smallest planes, the *Wee Bee* has been demonstrated abroad at the International Air Pageant, London, England and at the Royal Air Force Pageant, Belfast, Ireland. In this country the *Wee Bee* has startled crowds by exhibition flights at the 1949 Cleveland National Air Races and other smaller air shows.

Designed, constructed and flight tested by Ken S. Coward and Associates of San Diego, California,

INSTRUMENTS on *Wee Bee*'s panel are observed in normal manner; pilot's head is protected by large windshield

PILOT-AUTHOR Bill Chana is shown here cruising the *Wee Bee* at 70 mph at 2,000 feet above Montgomery Field, just North of San Diego. Maximum rate of climb is 60 mph and stabilized out the plane climbs at a nice 400 fpm

the *Wee Bee* actually looks like a toy when displayed beneath the wing of the world's largest airplane, Convair's giant XC-99. However, in the design of the *Wee Bee* airplane, the purpose was to explore the possibilities of an extremely simple airplane. Small size and simplicity constituted the design theme, and from the over-all design to the smallest detail part, this was adhered to.

The aerodynamic configuration is conventional. The landing gear is tricycle with the nose gear steered from the rudder pedals. The main landing gear is of the spring type and incorporates hydraulic brakes. For this smallest of airplanes, we naturally had to find an extremely small powerplant. Acceptable for experimental purposes only, we found a two-cylinder, opposed, two-stroke cycle "target drone" engine that develops 30-bhp at 4,000 rpm.

The comments we get from pilots at the local airports usually run, "That sure looks uncomfortable," or "Don't you get a stiff neck?" As an answer, we get these pilots to try out our prone pilot position. Then we hear them say, "Well I'll be. . . . I think I could fly it," or "It's not really uncomfortable." Of course, we knew this before the inquiring pilots did. In fact, our own USAF Aeromedical Lab has developed a pilot (prone position) bed and found it to be "safer and more comfortable to lie down while at the controls" of military aircraft.

The prone-pilot position on the *Wee Bee*, however, was used chiefly for simplicity and weight reduction. The control system was designed as near like conventional stick-type controls as possible. The pilot reclines face downward with the torso inclined upward slightly, the thighs flexed downward, and the knees flexed so that the lower leg lies parallel with the fuselage reference plane. Airfoam is used for the bed proper, and is three and one half inches thick, supporting the torso over a considerable area, the knees and the chin. The upper part of the arm lies at the side, and the lower part extends through holes in the upper part of the fuselage. The arm hangs naturally in this position, the right hand grasping the control stick and the left hand grasping the throttle. The control stick is mounted in the same position with respect to the torso that is used in the conventional sitting position. It is thus mounted horizontally, fore and aft, so that the pilot who has acquired experience in aircraft with stick control will have no difficulty in the *Wee Bee* with flight-control coordination. Thus, he moves the stick up and down for elevator action and left and right for aileron action. The (*Continued on page 43*)

AIRPORT with Profit

By DICK BRITE

Kaddy Landry, the girl flyer, brought her lightplane down at Flushing Airport in New York, pulled out her luggage and slung the gear into a waiting taxicab.

"Where you from, lady?" asked the hackie.

Kaddy wasn't feeling much like conversation with a loquacious cab driver. She had flown cross-country and run into tough weather. She was tired, and her answer was short.

"Miami," she said, and lit a cigarette.

"Yeah!" exclaimed the cabbie. "What airport do you fly from?"

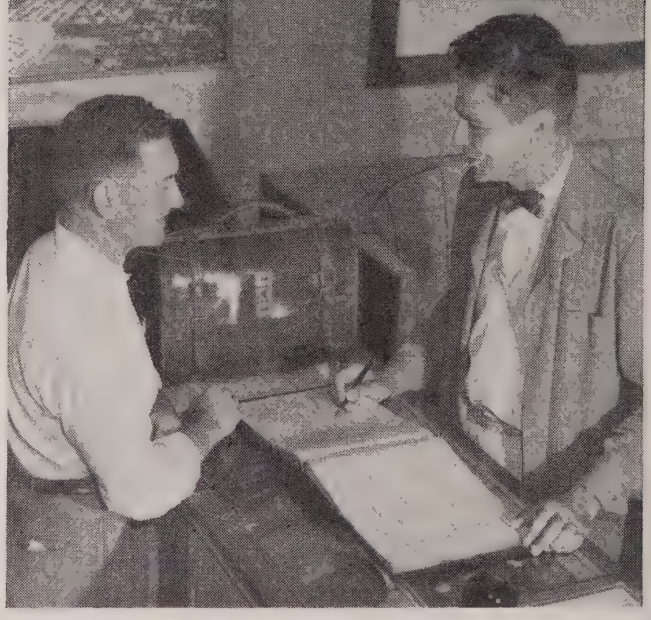
Kaddy couldn't figure why a hackie would ask a question like that. Her interest was aroused just enough to tell him she keeps her plane at Sunny South Airport in Miami.

"What do ya know!" yelled the driver. "That's where I learned to fly. How's Bob and Al and all the rest of the guys?"

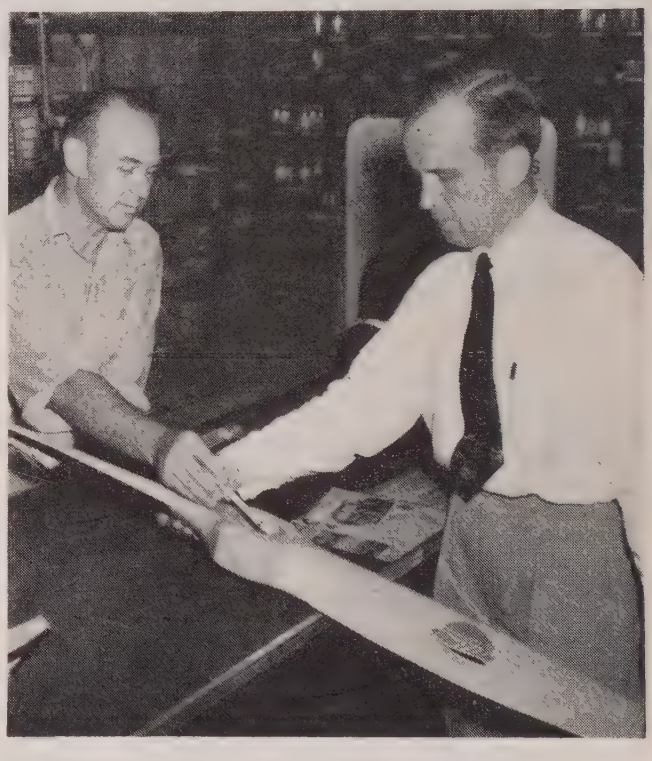
His name turned out to be Dominic, and they batted the breeze all the way to the hotel. Kaddy enjoyed the conversation and told the crowd at Sunny South about Dominic on her return home. But she did not tell the cab driver that his case was not at all unusual. In flights here and there she has come in contact with hundreds of people who have learned to fly at Sunny South, or sportsmen pilots who have used its facilities.

During a year, Sunny South Airport will entertain 1300 transient lightplanes. It found tie-down space for 400 planes during the last Miami All-American Air Maneuvers.

On her flight from Miami to New York, Kaddy stopped at airport after airport along the east coast,



OFFICE MGR Canfield welcomes aerial visitor to Sunny South. Last year the airport registered 1300 transients



PARTS DEPT McCulley sells H. Gregory a prop. During 1949 airport took in $22,000 in labor and sale of plane parts

CHARTER flying for hunters and fishermen is consistent, profitable. These hunters are after quail in Everglades

SUNNY SOUTH AIRPORT is just short distance from downtown Miami. Bus for downtown district stops at the door

T-HANGARS are available for plane owners *(below)*. Airport's logbook shows 120,000 take-offs, landings a year

MIAMI police harbor patrol fly out of the airport. Here Sgt. Yancey *(wearing helmet)* takes off with an observer

and found them all terrifically unbusy. At one stopover she had to chase a couple of hound dogs off the runway before she could land. Indeed, she maintained that the start and destination of her flight were the only two airports where she saw any business at all.

While dogs and cattle decorate runways of airports elsewhere, Sunny South's logbook shows 120,000 take-offs and landings a year. While private airports nation-wide are dead or dying on the vine, the Miami operation's annual records show $27,000 in sales of gasoline and (*Continued on page 49*)

OPERATION ZERO-ZERO

By BOB ARENTZ

Control Approach in Alaska.

If you fly in Alaska with the Air Force, you fly weather *per se*. And, flying weather, you get pretty well acquainted with the wizardry of those ghostly dark and shadowy magicians who sit hunched over the black and greenish radar dials at each important base of operations.

It is impossible to over-rate their importance to the smooth function of all Air Force operations in the Alaskan Air Command's sphere of activities. There are days and nights on end when everything that goes and comes from any base in the theater is on instruments from take-off to landing, and in certain places the take-offs and departures are routed out by GCA as well as the landings.

This not only includes bombers and transports, it applies to jet fighters, liaison aircraft, and all the variety of planes and pilots who make up our farthest northern defense line.

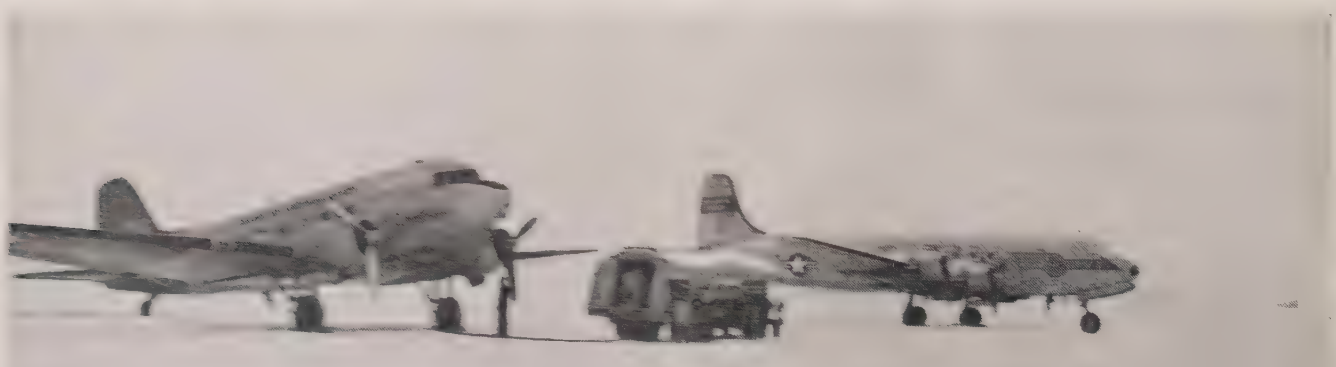
The fact that jet aircraft are now operating on a "routine" basis on missions that go out through 30,000 feet of solid overcast and come back into valleys surrounded by mountains is sufficient evidence to take the case for GCA successfully through any opposition.

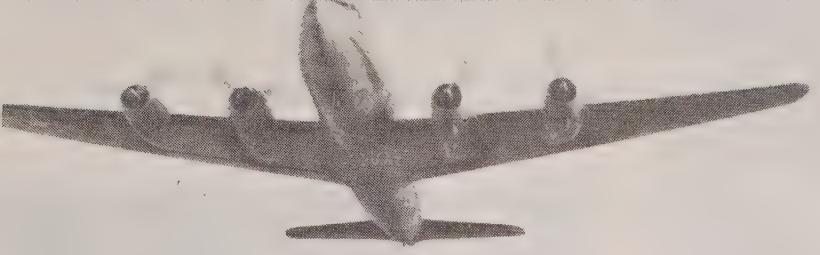
But, in addition to the thousands of routine missions familiar to all pilots, there is hardly an outfit flying in the theater that doesn't have more than one pilot and crew who take their hats off when they pass a GCA unit.

These are the men who have landed, rolled to a stop, opened their window or canopy and looked down for their first sight of the runway on which they were sitting. After that, in ice, or snow, or fog, with winds sometimes up to 70 mph 45° off the runway, you get pretty humble when someone asks how it feels to "trust" your life to someone on the

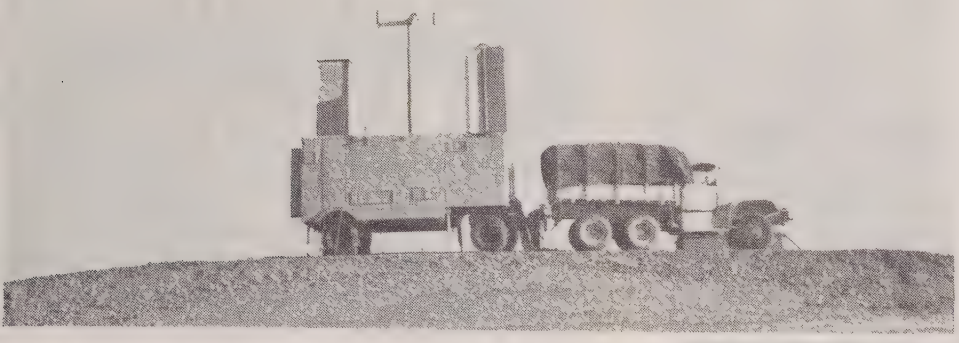
MAINTENANCE CREW begins snow and ice off the wings of a B-29 Superfortress operating out of Elmendorf in Alaska

BAD WEATHER more often than not, flight operations out of Alaska's bases are dependent on work of GCA men in the shacks. A top-notch GCA crew will give a pilot a one degree heading correction and a 10-foot glide path report





SKYMASTER, an Air Force C-54, is here making a GCA run at Great Falls AFB. GCA crewmen bringing plane in are working the scopes in the van



FLIGHT LINES that are wind-swept and bitter cold mean tough work for crewmen. There are days and nights when everything goes and comes on instruments

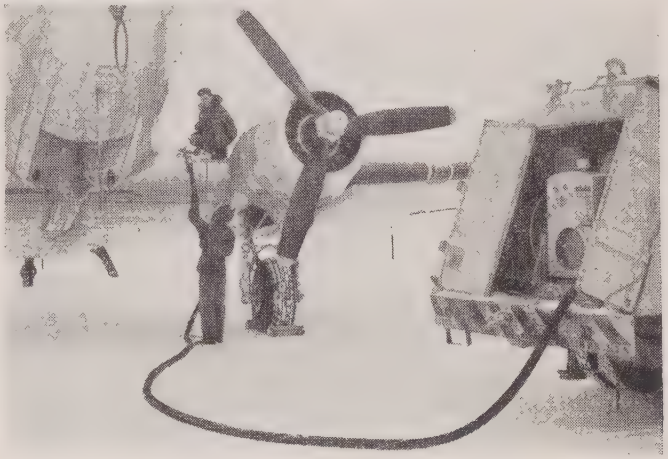
ground. And strange as it may sound, snow and fog together at ground level is not an uncommon phenomenon at some of the key bases on the Aleutian chain where 75 per cent of the landings are instruments below 400-foot ceilings.

That's when the information transmitted from a GCA controller is a mighty source of comfort to a MATS pilot terminating a 1200-mile flight in a C-54.

There is some contention as to just which GCA gang is the hottest—Shemya, Adak, or Cold Bay, depending partly, I guess, on just which group has brought a pilot and crew down in zero-zero weather when all alternates have closed and gas is about gone.

Having seen four in operation, and heard details on the other three, I'd reckon that when the chips are down and the first team has been put to work, you couldn't discriminate between any of the cadres under the command of the 59th AACS Group at Elmendorf AFB.

Perhaps, as many claim, the Adak Island detachment is the best because it gets the most practice, but they have all brought crews home alive who were living on borrowed time, so it's a question.

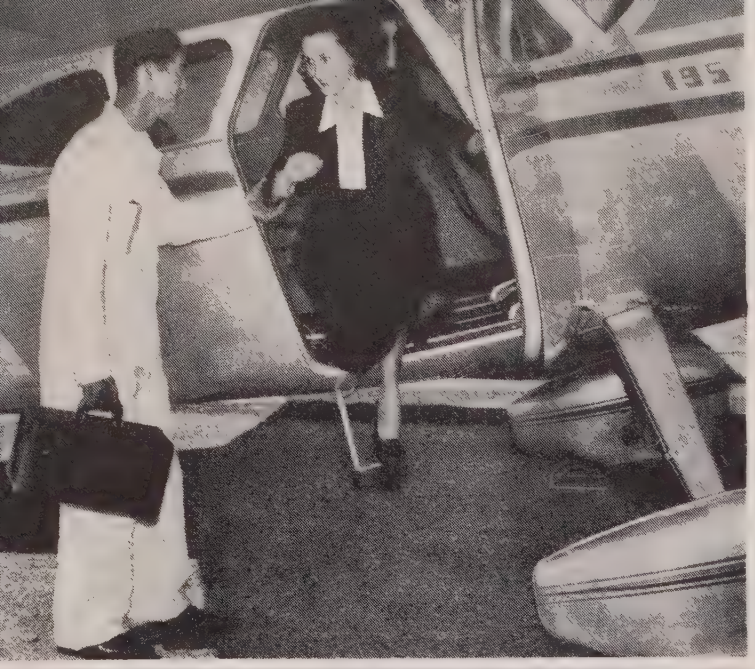


Not so arguable is the question, "What kind of men has the Air Force selected for GCA work and assignment to the rest of AACS' operations—which include tower controllers and airways traffic control off the CAA routes that criss-cross Alaska?"

The word for it is excellent. AACS and the Air Force in general was fortunate when a lot of former officers re-enlisted under the plan where they could become master sergeants with predetermined assignments, retaining reserve (*Continued on page 48*)

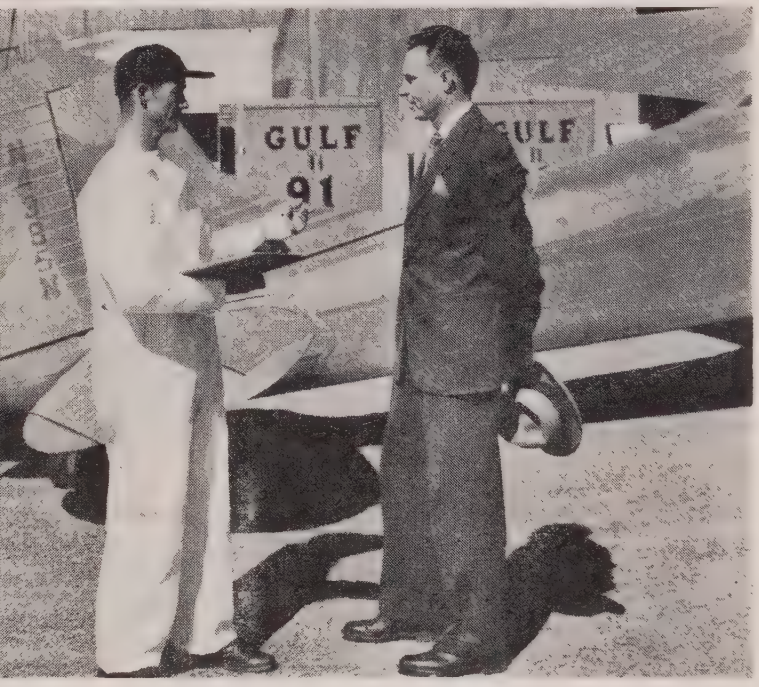
JET FIGHTERS, here an F-80 and Canadian *Vampire*, are brought in to safe landings, thanks to the GCA boys

ELECTRONIC developments are expected to move the GCA shacks from edges of field where they could get clobbered



SERVICE starts with helping plane passengers alight from aircraft and looking after luggage

Service Brings $$



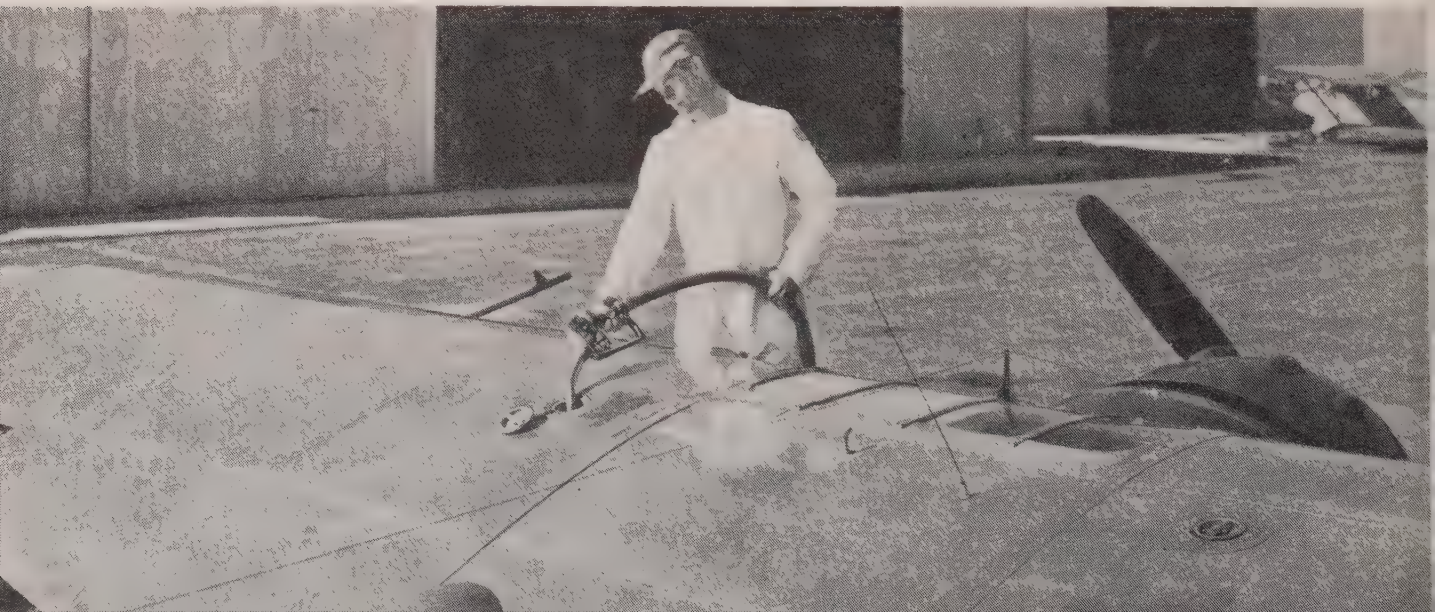
Pilots are the service operator's customers. and when the customer gets the service and merchandise that he wants, he keeps coming back for more. If he doesn't get what he wants, he goes elsewhere. It is, therefore, up to the airport service operator to keep his customers happy and satisfied. By so doing, he adds dollars on the profit side of his ledger.

The pilot who's just completed a cross-country is a guy with a good memory. If he didn't like the service certain field operators gave him, he'll not only not return to that airplane service station but he'll also warn his fellow pilots to keep away. And there's no grapevine system in existence that is more thorough and complete than that which exists in the flying fraternity.

So, to guarantee the $$$'s coming in, the

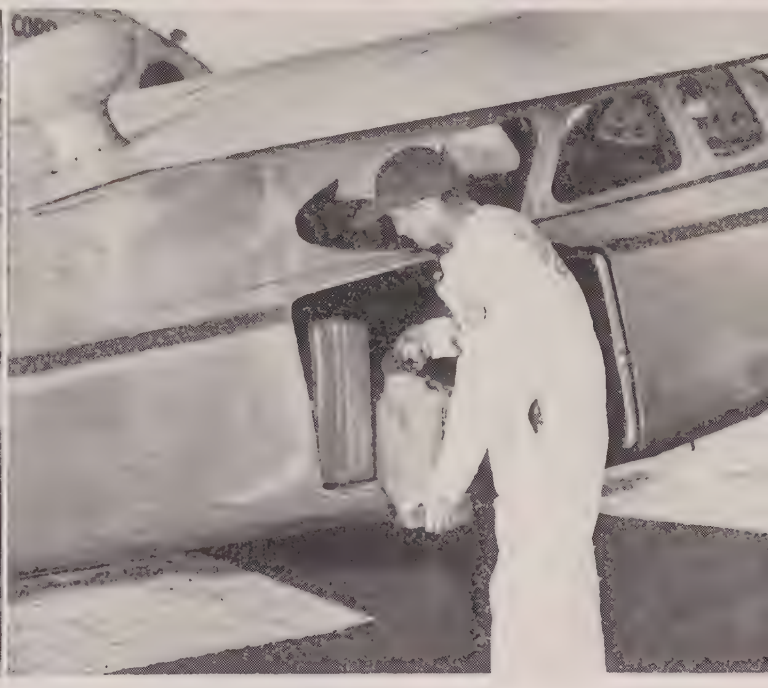
SERVICEMAN then takes the pilot's orders for service on his plane. A smart operator always suggests a gas "fill-up"

GAS-U? calls for serviceman to check engine octane requirement, then ground the plane . . . and fill the tanks



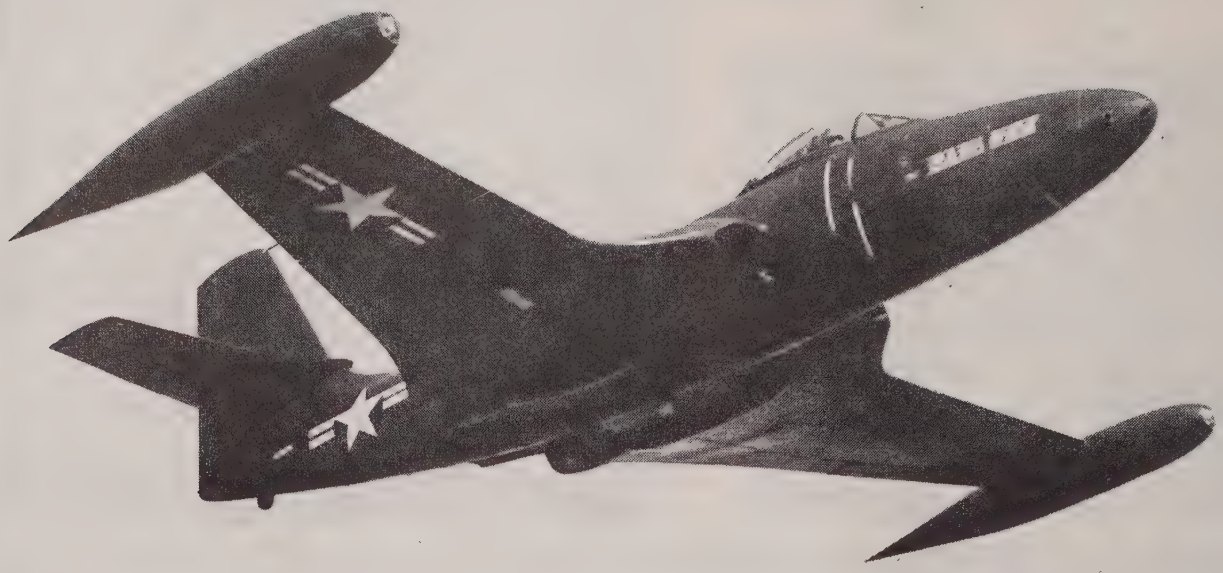
service operator must guarantee the pilot-customer's coming in . . . . and to do that requires plenty of service, for both pilot and plane, and courtesy on the part of the service operator and his employees. Here are a few suggestions, offered in pictures, from Gulf Oil. There's many an operator in the U. S. selling lots of service, but there are also several gas stops within the States that still think the transient pilot is a fend-for-himself kind of guy. This is for those operators who aren't making money now, but who want to.

SERVICE EXTRA that means extra $$$'s includes cleaning off windshield, cleaning dirty finger prints off plane, particularly around oil cap, and giving the ship a good line check. Report findings to the owner



PLANE SERVICE completed, serviceman should secure plane for night, either in hangar or tied-down

DEPARTURE time is important to plane owner, so good service means the operator will have plane ready to leave



BAIL-OUT from today's high-speed jet planes produced problems of pilot protection that are, as yet, only partially answered. At Edwards AFB tests are being made on ejection seats *(left)*. This shows how pilot of jet plane is tossed out of his airplane

Speed of sound brings with it a Pandora's box of headaches in safe 600-mph bail-outs

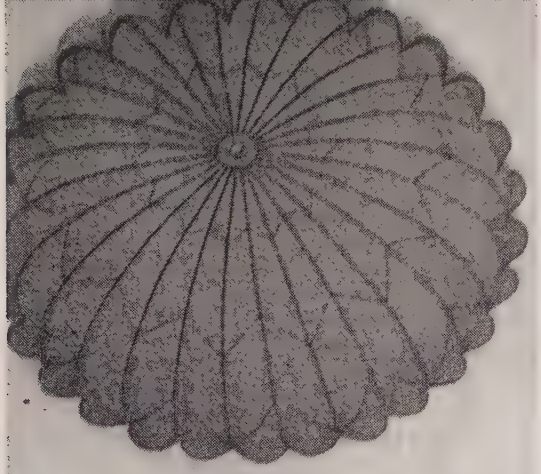
By LCDR MALCOLM CAGLE, USN

High-Speed Bail-Out

Membership in the Caterpillar Club is still open to inadvertent parachutists—if you're interested. Business isn't rushing, however, and applicants aren't frequent. Not among the jet jockeys, that is.

When the speed-of-sound age arrived, it brought with it a Pandora's box of headaches. One of the most neuralgic was the 600-mph bail-out problem. You've probably held your arm out of an automobile making 60 miles an hour and planed your palm on the air flowing by. Maybe you've even stuck your face out in the slipstream of your private airplane, and had your mouth blown open. If so, you can imagine the beating a pilot takes when he bails out at near-sonic speeds—about the reception you'd get standing in front of Citation's starting gate when the bell rings.

Getting out of the plane is just the *first* problem, however. After you've survived this kick-in-the-teeth, you yank

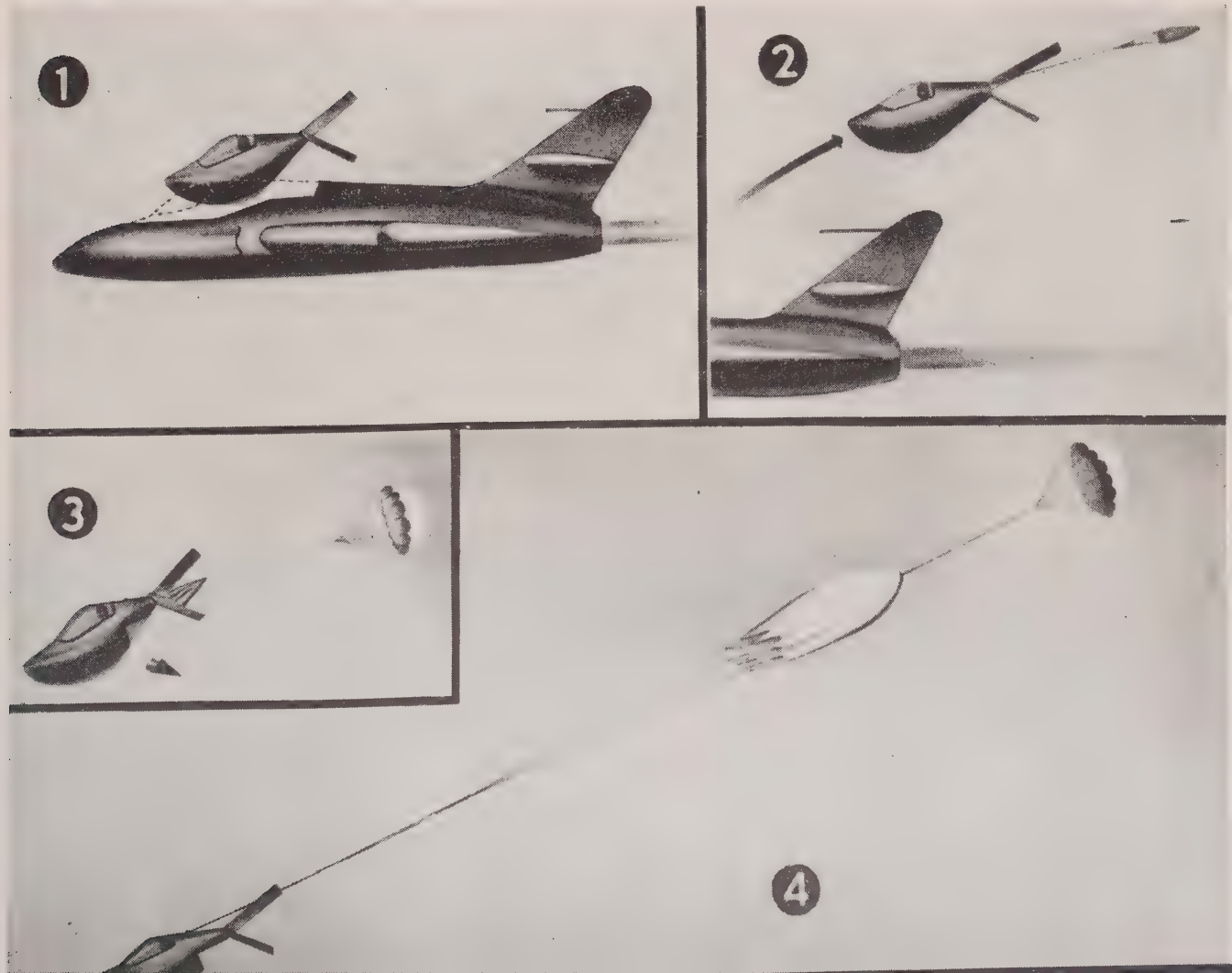


STANDARD bail-out at 600 mph would produce deceleration of almost 50 G's. This bail-out from "slow" plane produces 16 G's

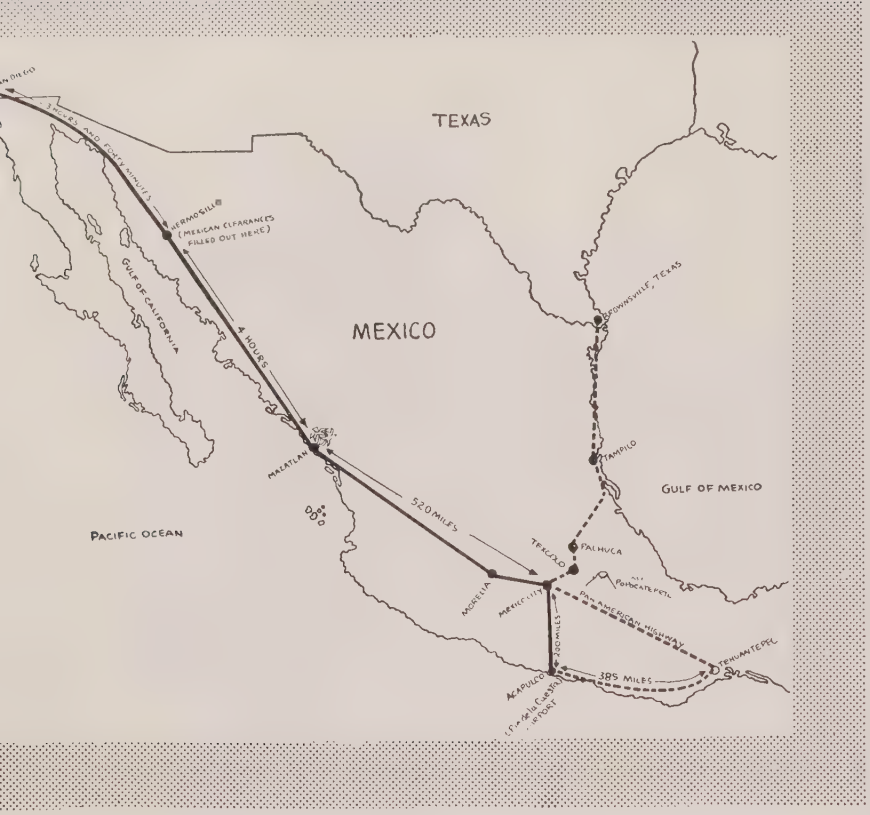
the rip cord. With a "standard" chute, at 600 mph the deceleration produced is almost 50 G's—one G equals your weight. You can compare this to the sensations you'd have hitting the sidewalk after jumping off the Empire State Building. Even if you could manage *this*, you would still have two pregnant possibilities—suffocation and freezing. At 30,000 feet, you can freeze your feet or hands before you float down to warmer air, and without an oxygen supply you can suffocate.

This shouldn't be taken to mean that the bail-out problem is insoluble, that progress isn't being made or that pilots can't get out of a doomed airplane anymore. The point is that parachutes, like many other phases of the aviation art, have been vastly changed in a few years and that by itself, the old fashioned pre-war silk parachute is as out of style as pink teddies and raccoon coats. Nylon is the fabric, naturally, and ideas for new parachutes and escape devices are as numerous as cigarette butts on the floor outside a maternity ward.

This race for new styles in parachutes is of recent origin. For about 150 years, parachutes followed a rather stable design and size. A Frenchman named (*Continued on page 40*)



CAPSULE get-away from disabled sonic-speed jet plane follows this pattern: pilot's pressurized, insulated compartment (1) is jettisoned; pilot 'chute (2, 3) pulls out the main chute. Main chute (4) supports descent of pilot in Navy's new break-away cockpit



SURVEY flight took Pilot-Author Downie on 3,000-mile trip from San Diego to Acapulco, Mexico and back again in a new *Navion*

Survey flight to Mexico offers good old-fashioned adventure to two who fly south of the border

By DON DOWNIE

AIRWAY TO ACAPULCO

WHAT'S the most beautiful airport you've ever seen?

For the scenic beauty of tropical beaches and beckoning cocoa-palms, the Pie de la Cuesta Airport in Acapulco, 200 miles due south of Mexico City, is just about tops. There are 5100 feet of paved runway at an elevation of 10 feet. A coconut plantation has a hundred-foot cut in the towering trees for the final approach to the airport. Even crocodiles infest the Laguna Coyaca that's under your wingtip as you turn in on your final approach.

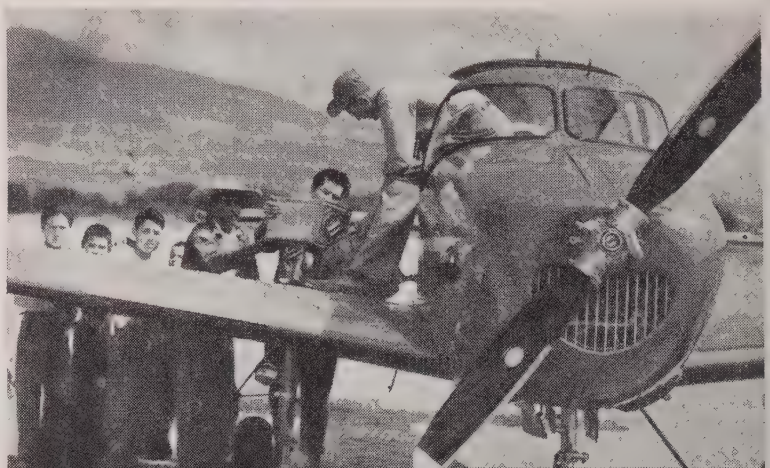
It looks like the Tutwilla Airport in Pago Pago, but it's much easier to reach . . . and more fun.

Late summer or early fall is a good time of the year to fly south of the border—if you don't mind landing before the daily rain showers begin in the afternoon. The heaviest tourists season in Mexico is in the winter months when refugees from the snow-covered North escape rough winters. During summer months, Mexican hotels are not completely jammed, tourist rates prevail and English-speaking guides with their sight-seeing automobiles are relatively more reasonable.

For an innovation in aviation reporting, come along on a 3,000-mile SKYWAYS survey flight through Mexico with a destination at picturesque

FIRST STOP out of the U.S. for gas was at Hermosillo, 3 hours 40 minutes out of San Diego

GASOLINE must be strained through a chamois to make sure no water or dirt gets into lines. This stop was at Morelia



Acapulco. This trip, flown in Ryan *Navion* 4916K, covered a good part of the airways of Mexico. If you fly to Mexico, you may encounter some of the same experience.

There's a lot of old-fashioned adventure in Mexican take-offs with nothing for navigation but a map, sketchy weather reports and no previous knowledge of the country ahead. A cross-country trip in Mexico has many of the aspects of a flight in the United States 20 years ago. It isn't easy, but the picturesque spots you visit after landing make up for most of the headaches in flight.

A junket to Mexico takes more preparation than a quick trip across the States. You must have tourist cards for everyone in the plane and a flight permit for the aircraft. Two dollars and 10 cents and 10 minutes in any Mexican Consulate will take care of the tourist cards. The flight permit takes a letter or a wire to the Mexican equivalent of the CAA (Jefe Aeronautica Civil, Secretaris de Communicaciones y Obras Publicas, Mexico, D.F.). It should include the following information: Full name and citizenship of pilot, grade and number of pilot certificate and ratings, make and model of aircraft, identification number, full names and citizenship of all other persons aboard, port of entry into Mexico, proposed date of entry, proposed itinerary in Mexico and a statement that the flight is for tourist or pleasure purposes. Cost is supposed to be $4.65.

You can go to Mexico without any inoculations, but you'll get the needle from the U.S. Public Health Service when you re-enter this country. You'll get a smallpox vaccination for sure and some ports of entry require a typhus shot within the past year. While it is not required, many doctors recommend a typhoid fever shot in addition. Best bet is to get your shots a couple of weeks before you leave—and get a doctor's record of them, or you'll have to do it all over again on your way home.

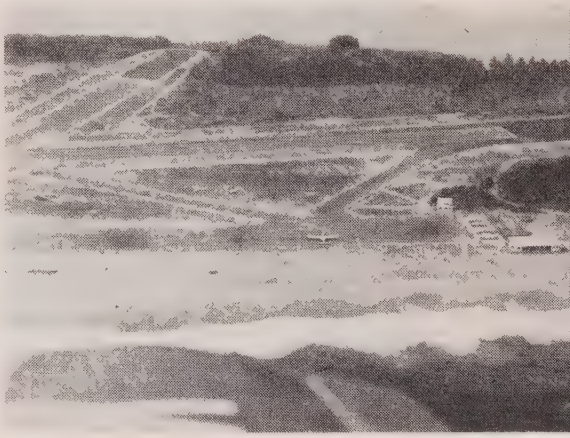
"If you can peel it, eat it," applies to all fresh vegetables. Water in the larger towns is perfectly okay, but if you land in a cow-pasture airport away from the beaten path, stick to canned fruit juices, bottled water or the excellent Mexican beer.

When you make up your mind to fly out of the country, you'll have to do a little "paper work." You must clear out of the United States at a designated port of departure and make your first landing at a designated Mexican port-of-entry. Skip either formality and you're in International red-tape up to your ears.

Probably the place to clear either in or out of Mexico is the International Airport at Brownsville, (*Continued on page 36*)

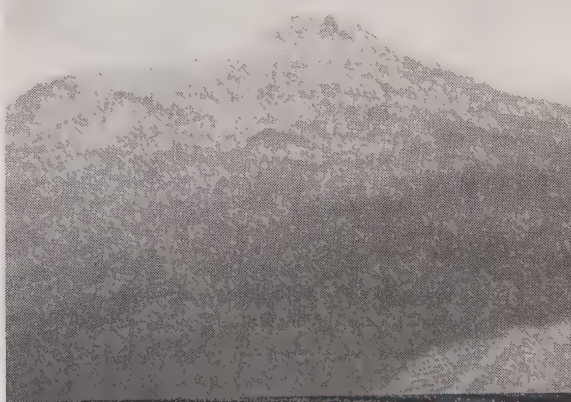
BAGGAGE carriers at Mexico City will help you through maze of agencies for 20 pesos

DEPARTURE from Mexico City on trip back calls for walk on burlap tray soaked with disinfectant before boarding your plane. Airport *(below)* at Acapulco is on the ocean



BROWNSVILLE is airport of entry. Customs officials must be notified as well as Immigration men at least one hour before your arrival

POPO, as Popocatepetl is called, is 17,883 feet high, is 40 miles SE of Mexico City



Circuit Maintenance

By WILLIS L. NYE

In these days of high-cost flying hours and the proclivity for various components of the electrical system to cause trouble, some of the expense of maintenance can be reduced if the owner of the plane can accomplish minor repairs himself. As an owner, you also will be in a position to analyze your maintenance expense on the electrical system if you familiarize yourself with the basic fundamentals of operation. In this manner your chances of being overcharged for electrical repairs will be lessened.

A simple electrical system in a lightplane consists of three fundamental parts:

1. A storage battery or an engine-driven generator.

2. The wiring to accomplish electrical current distribution.

3. The electrical components which comprise the load.

(By referring to Fig. 1,) The electrical wiring has protective fuses or circuit breakers and switches. These devices control the flow of the electrical energy. The amount of electrical energy required for operation is a direct function of the electrical components which are simultaneously in operation. The electrical load or the running load, as defined by the CAR, comprises the total amount of electrical current required for the operation of the lights, instruments, or radio equipment which is in constant use. These electrical components which are used intermittently are excepted from this definition. The running load drawn from the source of electrical energy is the current necessary to operate the lights, instruments, and radio equipment.

Lightplane storage batteries at best have only a limited ampere-hour capacity. When replacing a storage battery, be certain that the new battery will have sufficient ampere-hour capacity so that the voltage drop when supplying the normal running load in flight at maximum endurance will not be more than 20 per cent of the rated voltage. This is a safety precaution. When an engine-driven generator is used on lightplanes which have a 12-volt system, the permissible drop in voltage should not be more than 50 per cent under identical conditions.

BATTERY for the Stinson's electrical system is installed under cowling for easier servicing. System is 12-volt

Lightplane electrical systems are designed for (Fig. 1 and 2) 6- or 12-volt direct current battery operation. In the 6-volt system, the storage battery supplies all of the necessary electrical energy for the operation of the instruments, lights, and radio equipment. The 12-volt system is the most desirable to operate because it has an engine-driven generator in addition to the storage battery. In flight as well as on the ground when the engine is running, the engine-driven generator provides all electrical power.

As an owner, you should become reasonably familiar with the installational details of the wiring in your plane. If you do, you can then perform inspection of the wiring and also be in position to direct and check the quality of any repair work you may have performed.

All electrical wiring is insulated because the airplane structure functions as a common ground for the entire electrical system. That is the way the circuit is designed. So, therefore, where insulation has been damaged and the wiring is chafing on the adjacent parts of the structure, a short circuit may result, causing an accidental grounding of the entire circuit in flight and becoming a potential source of fire. Tape, transparent plastic tubing or insulated flexible conduit are used for repairs.

The wiring is supported by a suitably insulated attachment clip (Fig. 3). Where the wiring runs in the same direction, it is sometimes grouped into a bundle, wrapped at intervals, and then secured by an attachment clip. Where bare metal attachment clips are used, the wiring should be wrapped with tape, plastic strip or plastic tubing. Because wire bundles sometimes tend to slip because of engine vibration in flight, a periodic check is recommended for the security of the attachment clips. If waxed cords are used to tie a wire bundle to the framework, make certain the knots are tight.

Splices in the electrical wiring are permissible inside the junction boxes or on open wiring. Splices in the electrical wiring may be made permanent or disconnectable. However, special swaging or crimp-

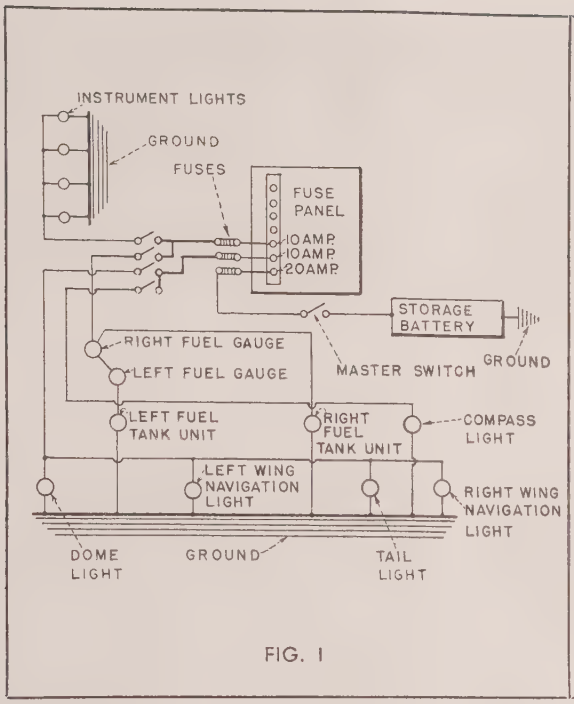


FIG. 1

DIAGRAM shows the electrical circuit for the six-volt system used on many personal planes

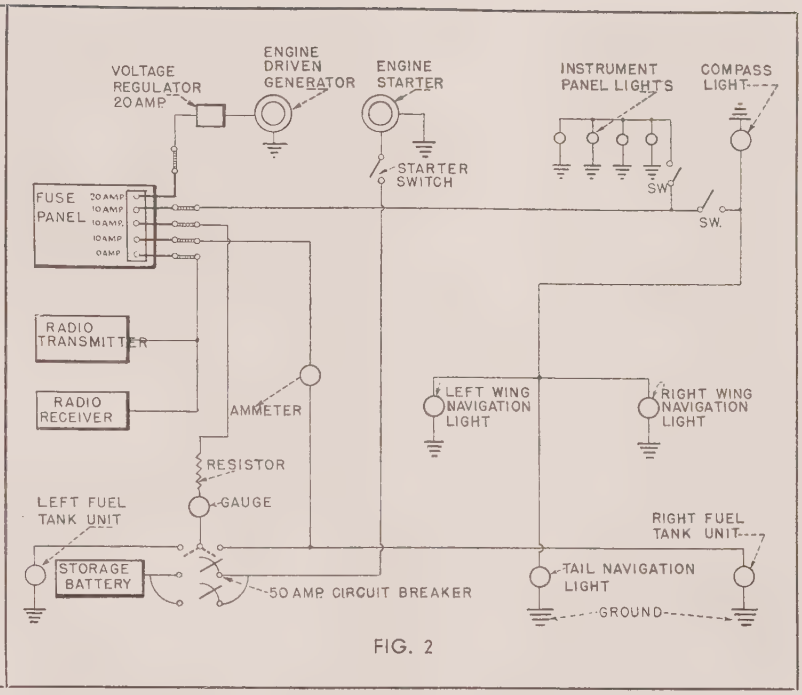


FIG. 2

DIAGRAM shows the electrical circuit set-up for lightplanes that use the 12-volt system. This includes Stinson, Cessna, etc.

ing pliers should be used which secure the wire in the splices by a crimping action or by right angle stakes in the splice lug. Splicing is not permissible on thermocouple wiring, magneto wiring, or on multiple cables. (Fig. 4 and 5, page 28).

The lugs on the ends of wires are made of tinned copper so that soldering may be easily accomplished. Lugs may also be attached to the wire ends by means of the crimping pliers. In order to prevent corrosion, only rosin core solder should be used for attaching lugs to the wire ends.

Electrical wiring is attached to the terminal blocks or strips. The terminal blocks are made of dielectric materials and have binding posts to permit the securement of connections and lugs. Terminal strips are attached to the plane framework. At the binding posts, wiring should have reasonable play at the connections for each individual wire lug.

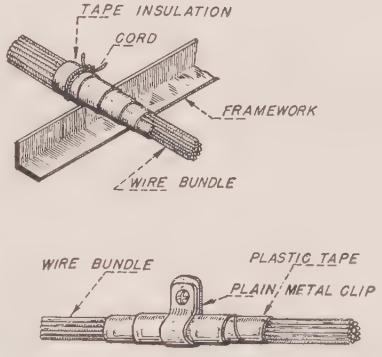
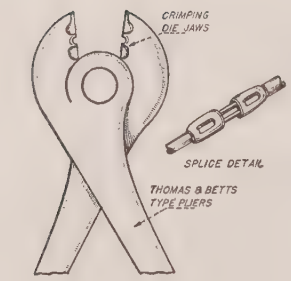


FIG. 3

Electrical disconnect plugs and receptacles are used on the engine firewall, or where a specific electrical part must be removed or isolated from the electrical system. The part to which the wires are attached is called the plug, and the stationary part which is secured to the structure or part is called the receptacle. In addition to the friction or screw fit, safety wire should be (*Continued on next page*)

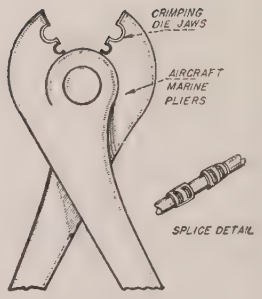
ELECTRICAL SYSTEM must be properly bonded and shielded to insure good radio reception. See radioman for this

FUSES for various electrical devices on Cessna 140 are located beneath the electrical switches under the panel



THESE PLIERS SECURE WIRES BY LENGTHWISE STAKES ON ANY SPLICE IN WIRE SIZE NO.22 TO 10

FIG. 4



THESE PLIERS SECURE WIRES TO SPLICE BY RIGHT ANGLE STAKES AND USED ON AIRCRAFT MARINE PRODUCT SPLICES

FIG. 5

used to secure the plug and receptacle where there is a possibility that these may loosen as a result of engine vibration, and affect the safety of the airplane in flight.

You can identify the wires by means of numerals stamped on adhesive labels attached to the lug ends, or by foils which are stamped on each wire. This permits quick identification and allows easy tracing of the wire circuit. Transparent tubing is slipped over the labels to protect them (Fig. 6).

Licensed airplanes have an electrical master switch or equivalent which, when placed in the "OPEN" position, will prevent the flow of electrical energy to the distribution system. This switch is accessible to the pilot at all times. It is left in the "OPEN" position whenever the storage battery has been removed from the airplane or when the airplane is inactive. If these switches tend to malfunction, a new part of the same size, capacity and type should be reinstalled because it does not prove economical to repair them. Keep the lugs free of corrosion or oxidation. An increase in the electrical resistance may contribute to the poor operation of the entire electrical system and not give true indications on the continuity check made during the annual periodic inspection for licensing purposes.

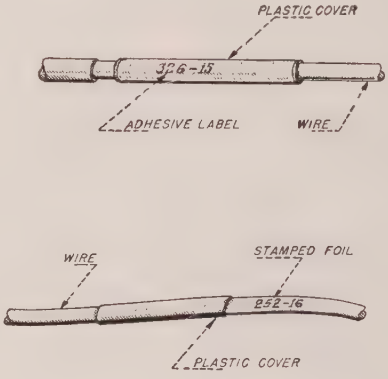


FIG. 6

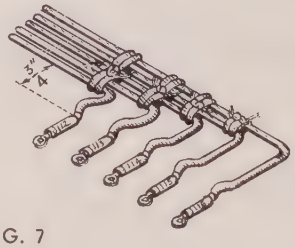


FIG. 7

WIRES to junction box terminal should have slack and a tie from the main bundle *(as shown above)*

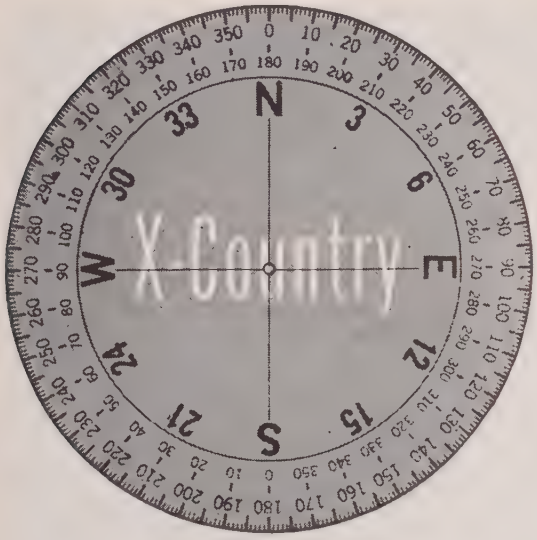
In the matter of electrical fuses and circuit breakers, spare fuses should be located in a fuse box or panel accessible to the pilot. Repeated flowing of the fuses indicates the presence of a short circuit, overload or ground in the electrical wiring. Replacement fuses should be of the same current rating as the original for which each circuit is fused. Fuse contacts and clamps should be checked for oxidation prior to installation so that good contact is assured.

Where a junction box is installed, be certain the junction box cover fits securely and that the method of attachment is positive. A small hole should be provided in the bottom of the box so that condensed moisture will drain away. Ample clearance must be provided between the wire lugs at the terminals inside the box. The locknuts on flexible conduits entering the box should be secure at all times. (Fig. 7).

Flexible metal conduits are installed forward of the engine firewall, and are supported by insulated clamps bonded to the adjacent structure. Flexible conduits should not be bent on a radius less than six times the diameter.

The function of electrical bonding connections is to provide a low-resistance electrical connection between parts of the structure which are not electrically insulated from each other. This provides a low potential ground return for the electrical system, and assures good conductivity between metal surfaces which function as shields. Proper bonding reduces the static noise level in the radio receiver headphones, and also reduces the hazard of spontaneous fire which is always present during fueling operations. Tinned copper wire braid is used for the bonding connections to which lugs are soldered. The bonding connection is secured to the structure where the surface finish has been removed to assure good electrical contact. Always be certain that the static ground connection is operative during fueling operations.

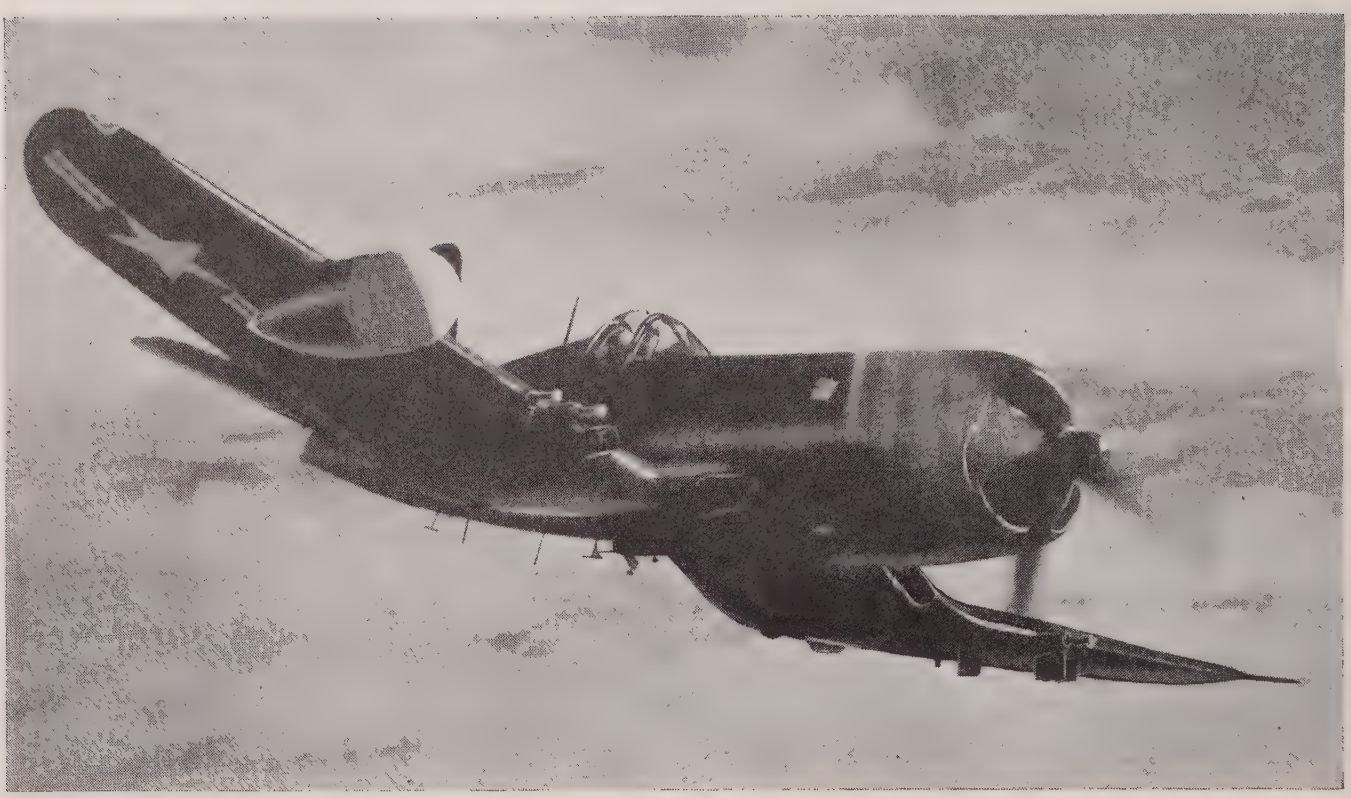
Engine-driven generators provide 12 volts of electrical energy for the operation of the electrical system as well as charging the storage battery during engine operation. Constant electrical voltage is maintained at the output terminals of the generator by means of varying the field current with a variable resistance element inserted in the field windings of the generator. Constant voltage, regardless of engine speed, is maintained over a certain range of engine operation, by the action of a spring actuated voltage regulator. However, the complete control of the output of the (*Continued on page 38*)



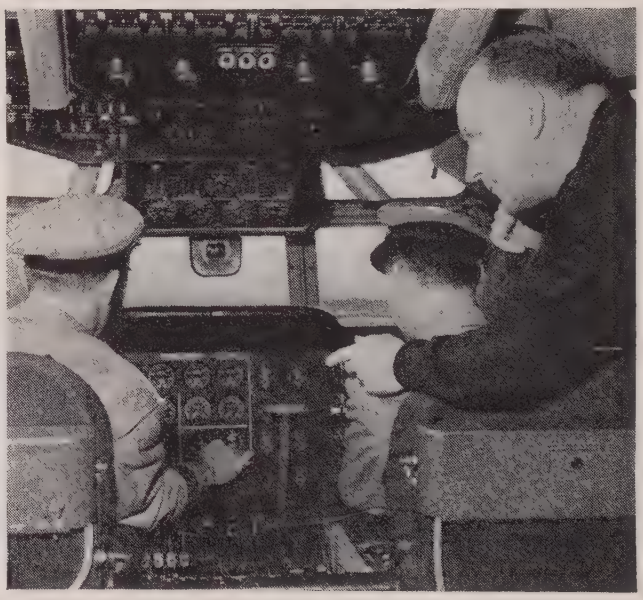
COLONIAL SKIMMER is still an experimental amphibian, but it's arousing a lot of pilot interest. Primarily a two-placer, the *Skimmer* can seat a third. Of all-metal construction and with tricycle gear, the amphib is powered by 115-hp Lycoming engine fitted with an Aeromatic F-200 prop. Tests show ship has 120-mph top speed, 110-mph cruising, 47-mph landing.

READY TO GO, eight Air Force B-36 bombers await take-off orders for a 10,000-mile non-stop flight over the Pacific Ocean area. Leaving from Fairfield-Suisun AFB, California, the 8th Air Force bombers made the flight as part of a series of what the Air Force has called "routine training flights."

KARHU 48, called *Tavi,* is a four-place personal plane of Finnish design, and it is approved for operations on wheels, skis or floats. The plane is powered by 190-hp Lycoming engine with Aeromatic 220 prop, and has a top speed of 142 mph. It cruises at 115 mph, lands at 48 mph, has 435-mile range. As seaplane, it cruises at 109 mph, 404-mile range.

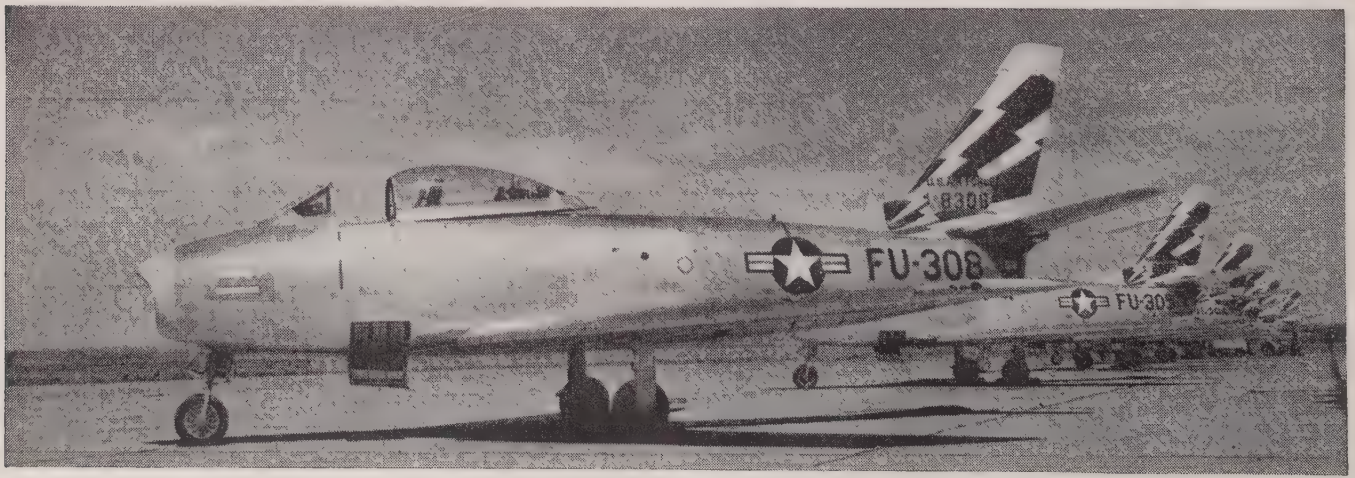


WORLD WAR II star is back on the stage. The Chance Vought F4U *Corsair* is presently in Korea pounding Red communication centers with rockets and bombs. Operating off carriers, the F4U's seeing action in Korea are part of the U. S. Seventh Fleet. That's radar on the wing.



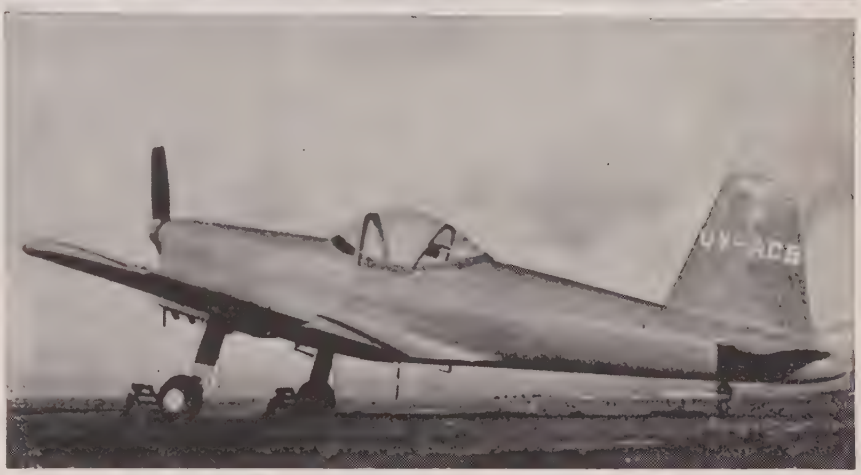
WHY'S, WHEREFORE'S of the Boeing *Stratocruiser* are here being taught pilots of United Air Lines. In this photo, Paul Reeder (*foreground*) explains workings of *Stratocruiser's* panel to two pilots being checked out in the aircraft. Flight crews get 20-hours air instruction

JETS are today defending the Pacific Northwest. These are part of the morning line-up of Air Force F-86's at Moses Lake Air Force Base, Washington. Called the *Sabre,* the North American F-86 is one of the fastest jet planes in operation today by the U. S. Air Force.

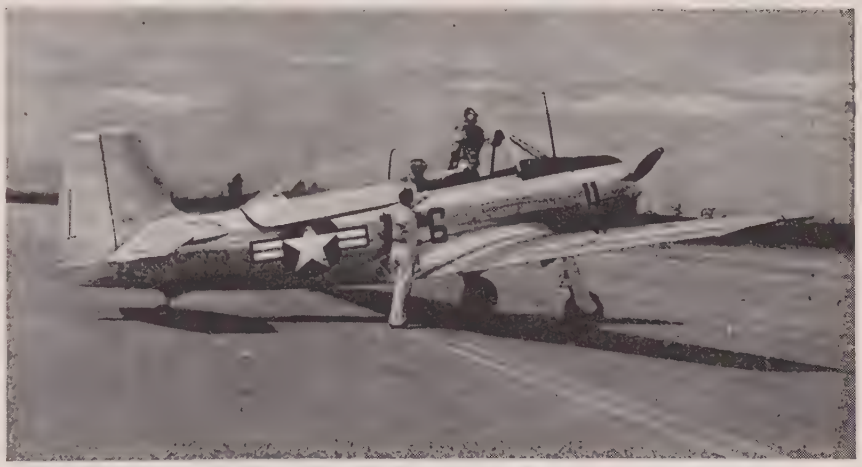


ANTI-SUBMARINE prototype being developed for the British Royal Navy is this YB-1, built by Blackburn and General Aircraft of East Yorkshire, England. It is powered by an Armstrong-Siddeley *Double Mamba* turbo-prop unit. Another version of this airplane has an identical fuselage but it is powered by a Rolls-Royce *Griffon* piston engine, and is designated the YA-5. Both anti-sub planes are two-seaters, have inverted gull wing. No details of performance are available.

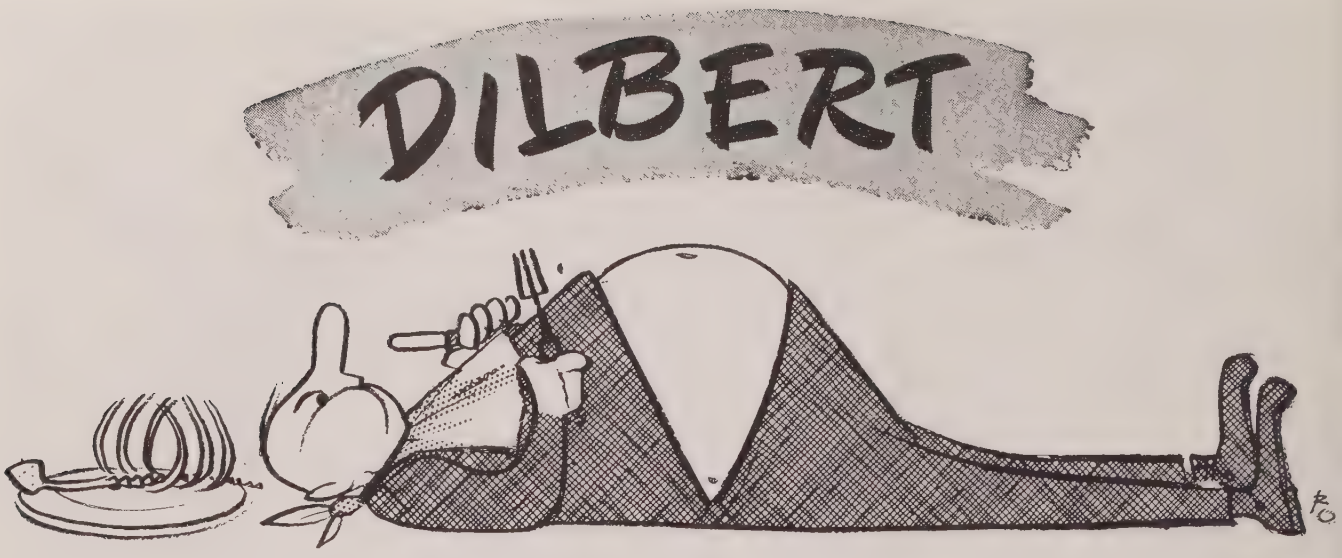
AEROBATIC TRAINER built by Skandinavisk Aero Industri of Denmark is designated KZ VIII. A single-seater of all-wood construction, this plane is stressed for 12 G's. It is powered by *Gypsy Major* 10 engine of 145-hp and has been fitted with a Walter aerobatic carburetor. The KZ VIII has a top speed of 171 mph, landing speed of 43 mph and climbs at 1,574 fpm. It has wingspan of 23 feet 7 inches, a gross aerobatic weight of 1,265 pounds, normal of 1,430 pounds.



FAIRCHILD T-31 trainer is presently undergoing evaluation tests at Randolph AFB, Texas. The first primary-basic training plane built to meet present-day military requirements, the T-31 is powered by 280-hp Lycoming engine with Hamilton Standard constant-speed prop. It has a top speed of about 166 mph at sea level, cruises at 142 mph at 65 per cent of power, and has a range of 880 miles at 110 mph. The T-31 carries crew of two. The Navy version is designated XNQ-1.



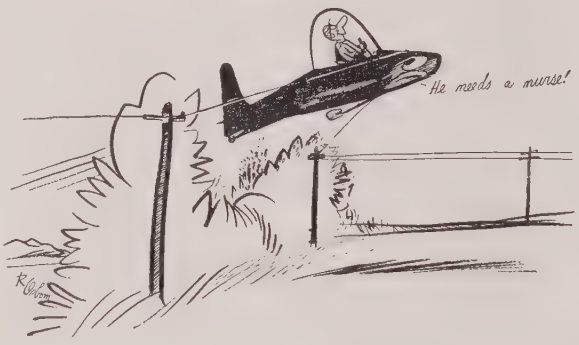
MOCK-UP of Allison 501 (T-38) turbo-prop engine is shown here installed in the Convair-Turboliner being built at Consolidated Vultee's San Diego plant for the Allison Division of General Motors Corp. The lower scoop is for the oil cooler, and the upper scoop is the air intake. A built-in monorail in the top of the nacelle facilitates installation and removal of the 2,750-hp engine. Note the open hydraulically operated cargo door in the aft part of the fuselage.



By S. H. Warner and R. Osborn

Avoid Those Wires—When the word collision is mentioned in connection with aviation, one thinks immediately of two airplanes flying into each other. Admittedly, this is the most dangerous type of collision, but your attention is invited to another kind; one in which many more people are injured.

The type of collision referred to is the one in which an airplane is *flown* smack into a fixed wire strung between two poles. Of course, the reason so many more people are injured in such accidents is that there are so many more of them. And the sad part of it is that all of them are absolutely unnecessary.

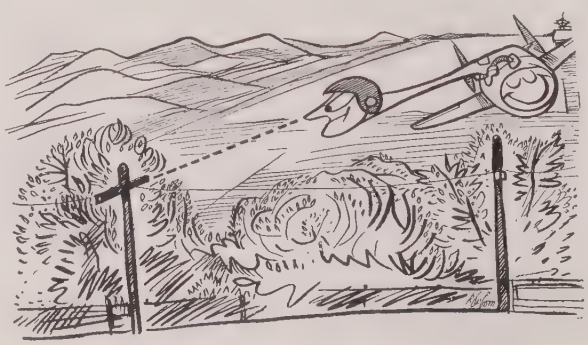


Let's see what causes these wire collisions, and what we can do to miss them. In the order of frequency, their major causes are: 1. Failed to observe; 2. Misjudged distance; and 3. Operated recklessly.

Now some Dilberts are too smart to be helped. Those pilots not so handicapped will be glad to listen to the sage advice of the CAB on this subject.

1. Scan closely for wires and poles whenever approaching the ground. (Poles can be seen for a greater distance than wires; however, poles are often hidden among trees.)

2. Scan for wires throughout the approach. Some wires cannot be seen very far away.



3. Maintain an extra margin of clearance when approaching over wires to allow for variable lift conditions.

4. Execute simulated forced landings only to a safe minimum altitude of 200 feet.

5. On take-off, fly the plane over the wires; do not stall it over! Remember that too rapid and too much back-stick means a stall and mush, in spite of full throttle.

6. When making an emergency take-off, examine the terrain thoroughly for roughness, and make a careful estimate of the height of obstructions. Know your best climbing speed.

7. Watch out for the presence of wires across lakes and rivers.

Keep alert to the importance of alertness.

Shout It Again—Sitting behind an L. M. D. (Large Mahogany Desk) a good deal of the time, and flying only occasionally, is a bad combination for any aviator. That's what a friend of mine wrote to me the other day. His experience may serve to warn other desk-bound pilots.

While on a familiarization hop in a large twin-engine job, he and his co-pilot ran into a bit of weather. Both men (*Continued on page 46*)

Famous last words: "Engine's running rough but it'll clear when we get up!"

CAOA REPORT . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

New Members

The ink was hardly dry on the July Directory when applications began coming in from company executives who had seen copies of the original Directory and had become interested in the increased activities of the Association during the past few months. The following membership applications were accepted during July and August:

Geo. M. Brewster & Son, Inc., general contractors, located in Bogota, N. J. The company has operated a Beechcraft D-18S for the past four years, now based at Mallard Air Service, Teterboro. Chief pilot is George E. Bevins.

Grand Rapids Store Equipment Company operates a Beechcraft AT-11. E. A. McCready is president and general manager, and E. A. McCready, Jr., an ex-National Airlines pilot, is company pilot.

Rawson Motors, Inc. handle Pontiac sales in Plainfield, N. J. The company operates a Grumman *Widgeon* and Beechcraft *Bonanza*, based at Hadley Field, South Plainfield. Cas X. Gubernat is the chief pilot.

The Superior Oil Company of Burbank, Calif. and Houston, Texas, operates a large fleet of aircraft, with some emphasis on speed, as witness five converted Douglas A-26 attack bombers. Other planes include a *Lodestar*, a Twin Beech, three Grumman amphibians, and three *Navions*. Charles C. Walling, Jr. is the chief pilot.

Safety through Skydrol

An echo from the CAOA Forum came through recently in the form of a letter from Monsanto Chemical Company, St. Louis, expressing interest in the fine paper by Jerry Lederer on "Safety in Executive Aircraft Operation."

The letter states that there is "another way to make business air travel safer. It is to use the new non-flammable-type hydraulic fluid Skydrol in the hydraulic systems of executive aircraft. It can be installed when a plane is first converted or when on the ground for a major overhaul."

Skydrol is now used in three executive DC-3's with two more in process of conversion by Remmert-Werner, Inc. One of the planes R-W converted and which uses Skydrol is Arthur Godfrey's DC-3.

Ship-to-shore Radiophone

During his last trip to New York as pilot of Continental Oil's B-25, Eddie Ross dropped in at CAOA Hq to acquaint us with the details of a problem which may be of interest to many of our members. This concerns the Maritime radio ship-to-shore service for aircraft.

He said that during the past year only five calls have been completed, and these under ideal radio conditions. Not one satisfactory call for company president McCollum was completed.

Here are some of the points mentioned: (1) Weather static covers the ship-to-shore frequencies (LF), making communication practically impossible 50 per cent of the time. (2) The communication range in good radio conditions is from 100 to 150 miles. With any delay in getting the call completed, the aircraft will be either out of communication range or have landed at destination. (3) All Maritime stations are located on the coast, Mississippi River and Great Lakes. This provides no ground stations in the area where large numbers of corporation aircraft operate.

(4) Most Maritime ship-to-shore stations now handle their maximum communications capacity, making it very difficult for aircraft to get in a call.

(5) The equipment necessary for the service is bulky and heavy, taking up payload required for other uses.

In a conference with American Tel & Tel officials, Ross learned that the company had recognized the need of a special aircraft radiophone service, and had tried to obtain frequencies in 1947 from the FCC, but were turned down. Conditions may now be more favorable, and if frequencies can be obtained AT & T are ready and willing to set up a national coverage of ground stations to give aircraft the service needed. Here is a project made to order for CAOA to get its weight behind.

To set up this service the following frequencies are necessary: A minimum of five channels in the range band of 150 to 200 megacycles. The frequencies for the aircraft and those for the ground stations can have roughly a 60 kilocycle separation, but the two frequencies in each channel must have a five mc separation.

Executive pilots' experience with VHF for navigation and communication in the 108 to 123 mc range indicates that the 150 to 200 mc bracket would be successful for aircraft-to-ground radio-telephone communication.

It would encounter a minimum amount of weather static.

Having a special frequency for aircraft only would insure prompt service.

Ground stations would be located throughout the country in a pattern guaranteeing a station within range at all times from an altitude of 10,000 feet.

The airborne equipment required for the aircraft installation can be built light enough to be installed in single-engine executive aircraft of the *Bonanza*, *Navion* and Cessna 190/195 class.

Equipment is already available for use in the 150 to 200 mc band.

The present day need for communication from aircraft to office or office to aircraft is obvious, especially in those industries that are vital to national defense, a condition applicable to most members of CAOA.

Since the talk with Ed Ross, we have contacted AT & T and assured them of the Association's interest and help in this matter. We have also written Ed White of the FCC urging prompt action. We have talked to several pilots in and out of CAOA, and including our Technical Committee members, and we find that the complaints of Continental Oil are widely verified. One company, operating largely in the east and south, reported fairly satisfactory service under present conditions, but recognized certain bad features which the proposed special aircraft service would correct.

Members will be informed as to further action taken. In the meantime any comments on the subject will be welcome.

AIRCRAFT FLEET operated by Gulf Oil includes these four new four/five-place Cessna 195's

NEW!

...ULTRA-MODERN AVIATION FUELING

Cities Service joins with Eastern Air Lines to inaugurate another great advance

The *Flat-Tops* are on duty now—making notable service records. With these remarkable new tank trucks, Cities Service is fueling Eastern Air Lines planes at LaGuardia, Newark, and Boston's Logan Airport. Never before has there been any approach to the safe, speedy, convenient fueling now made possible by Cities Service *Flat-Tops.*

You'll be interested in major *Flat-Top* features listed here. Each one adds evidence that Cities Service is in the forefront of aviation progress. That's why fields offering Cities Service products are winning preference today, among those eager for topnotch quality and service.

A FEW FLAT-TOP FEATURES

NO REELS . . . All hose lies flat—out of sight—on wide, flat metal grating above tank.

UTMOST SAFETY . . . Remote hydraulic drive from tractor engine, to slave pump, to high-speed fuel pump, keeps prime power far away from fuel outlets.

HINGED LADDER . . . Rises from flat position on grating; elevates and rotates as required; locks in place, with hose lifted on guide rails. No more auxiliary ladders to cause injury or damage.

SINGLE VALVE TO DE-FUEL . . . This is just one of many features for new simplicity and surety . . . for definite savings of time and labor with this extremely efficient tank truck equipment.

Cities Service Aviation Gasolenes
Cities Service Koolmotor Aero Oils
Cities Service Cisco Solvent Engine Cleaner
Cities Service Trojan Aero Greases
and Aviation Specialty Products

CITIES SERVICE

AVIATION PRODUCTS

New York · Chicago
In the South: Arkansas Fuel Oil Co.

Airway to Acapulco

(*Continued from page 25*)

Texas, where we concluded this survey flight. Since it is located on a main airway, the field is set-up to handle a volume of light-plane traffic. Brownsville officials say that you can taxi up to the ramp, contact the Airport Manager's office and be on your way to Mexico in approximately 30 minutes. A flat fee of $3.00 is charged by the City of Brownsville to cover transportation of officials and incidental expenses. Two telegrams, one at the airport of your first landing in Mexico and the other to the Mexican CAA headquarters, must be sent at the pilot's expense—another $3.30. Sunday, holiday and after-hour clearances come high. Total fees for entering Mexico on a Sunday come to $17.45.

Rather than fly the same airway twice, we began this trip in San Diego, California, and re-entered the United States at Brownsville, Texas. Departure procedure at San Diego is virtually the same as in Brownsville, but all Mexican clearances were filled out at Hermosillo, our first stop south of the border.

South of San Diego the country was sandy and desolate so we religiously followed the "iron compass" of the once-a-day railroad down the Gulf of California. South of Mexicali we passed the "Laguna Salada" (dry lake) and the "Gran Desierto" (grand desert).

Even on this first hop we found the airways maps of Mexico to be comparatively inaccurate. We flew over at least one sizable town that wasn't on the map at all while a number of well-established ranch airports were not shown even though the maps were brand new. Incidentally, maps are scarce in Mexico, so pilots should bring a full set of up-to-date copies.

After 3 hours and 40 minutes of leisurely flying, we circled the 4500-foot hard-surfaced runway at Hermosillo. As we flared out for a landing, a truck drove out across the runway and continued on to a nearby group of adobe huts. We landed and were waved into a tie-down area covered with large thorns quite accurately called "puncture weed."

Customs Officials had gone for the day so we cleared officially into Mexico the next morning. There was practically no red-tape and we filled up with 158 liters (41.7 gallons) of gas. The gas and a 6 peso landing fee totaled 81.84 pesos or $10.20. The Mexican flight permit which should have cost $4.65 came to an even $10.00, but when you're a visitor in a strange country, you can't do much about it. We paid the $10.00.

Navigation was no problem on the four-hour hop south to Mazatlan. You merely follow the broad coastline with its many sand bars and wide lagoons. During the summer there is a frequent layer of haze, similar to the "smog" in the Los Angeles area that goes up to 5,000 feet and restricts visibility to about 3 miles.

Mazatlan has a truly tropical airport ringed with waving palm trees. The main all-weather runway is 3,000-feet long and lies parallel to the beach—and 90° to the prevailing wind. It is surfaced with large crushed rock that is fine for wet-weather operation but mighty rough on prop tips. Landing fee for the *Navion* was 4 pesos.

Mazatlan is one of the few seaport towns not overrun with typical tourist attractions. It is far enough off the beaten path to have some of the quaint tropical flavor that so many visitors miss. The town is famed for its deep-sea fishing.

It's easy to be fooled in Mexican hotels. In the new Freeman Hotel in Mazatlan the water faucets are marked "C" and "F". The "C" is hot—not cold. The "F"—which looks like an "H" at first glance is cold. Here the water is *C*aliente and *F*rio.

The flight from Mazatlan to Mexico City scales 520 miles if you make any effort to keep a highway or railroad in sight. South from Tepic you begin to climb into the high plateau of central Mexico and the accuracy of the maps really goes to pot. The World Aeronautical Chart for this area (Lake Chapala #590) has a number of red cross-overs correcting mountain heights. One peak, originally marked 5900 feet, now bares the corrected height of 7,633 feet. We found one mountain peak just south of the village of Tequila that showed only 7,000 feet on the map. Yet flying at 11,000 feet, we were barely above the crest.

The second largest town in Mexico, Guadalajara, is the midway point of this flight. We should have landed here for gas, but didn't because airport attendants at Mazatlan had said that the field was built on an old golf course and quite rough. However, it looked good from the 11,000-foot view we had going by.

Over 10 x 50-mile Lake Chapala we picked up a brisk headwind and the fuel gages became the most important instrument in the cockpit. As we approached the town of Morelia, a time-and-distance check showed that if all went well, we should reach Mexico City with about 4 gallons of gas in the tanks. So we landed at Morelia.

We taxied up to the single rickety hangar at the end of the 3200-foot down-hill strip and finally found a caretaker. He spoke no English. In our next-to-forgotten high school Spanish, we asked for gas. He pointed to the 52-gallon drums in the hangar and said that they were only for the daily flight of the Boeing 247 airliner.

The field did have a telephone and he called us a cab. We went into town over cobblestone streets and found the gas stations all closed. The main office of PeMex was closed for the day and the manager was out of town. That settled it for us.

We spent the night there in Morelia and listened to the Sunday night band concert while the young men and women promenaded around the public square in opposite directions.

When PeMex opened the next morning we asked for 80 or 91 octane fuel. The highest they had was 73 octane—and the field elevation was 6,363 feet. Could they deliver 20 gallons to the airport? No truck. Could they put it in cans and let the cab driver return them? No cans. Finally we bounced back to the field, pulled three five-gallon cans from the back of the baggage compartment and sent the cab driver back to have them filled. Eventually, we had 15 gallons of blue-tinted fuel that went into the rear auxillary tank. We took off with the remaining higher octane fuel in the front tanks. In flight, the ship ran slightly rough when we turned on the rear tank—out over the rugged "barranca" country with its awe-inspiring gorges—so we had the remainder of the fuel drained after we reached Mexico City. A mechanic put it in his car and it wouldn't run!

From our stay in Morelia, it would seem advisable for visiting pilots to stick to the large, regularly serviced fields operated by Compania Mexicana de Aviacion, the Pan American subsidiary. Their service approaches stateside operation and their station agents speak good English.

The Municipal Airport in Mexico City has parallel runways, one 8,000 feet long and the other 10,000. Field elevation is 7,347 feet so expect a materially higher touch-down speed than on sea-level airports. There is a great deal of scheduled airline traffic so contact the tower on 278 kc. There is no landing fee, but you will be charged 12½ pesos ($1.00 U.S.) for the use of the control tower. This airport has all the facilities, including good maintenance shops.

Across town adjoining the race track is a second airport, operated by the Aero Club de Campestre. This is a sod strip large enough to handle all four- and five-placers and service is good. The field has a definite hump in the middle and landings should touch-down in the first 200 feet to reduce the downhill roll.

Mexico City is a complete story in itself. There are the nearby pyramids, the floating

MAZATLAN AIRPORT offers 3,000-foot runway parallel to the beach and 90° to the prevailing wind. Runway is surfaced with crushed rock that is tough on the propeller tips

gardens, churches centuries old, parks and markets. You can read most of the story of Mexico City in almost any travel catalogue.

The flight from Mexico City to Acapulco covers everything from the perpetually snow-capped peaks of 17,883-foot Mt. Popocatepetl ("Popo") to rain-soaked jungle. The country is well populated, but not with airports. The Sierra Madre del Sur World Aeronautical Chart (#643) shows five "airports" along the 200-mile trip. All are emergency strips and all are shorter than 2500 feet. From the air it looked as though none had any servicing facilities. Plan to make the trip non-stop.

Normally you fly west to the Pacific Ocean. From Mexico City you fly almost due south, 190°, to Acapulco.

The rainy season in Mexico is from June through September. The average August in Acapulco will produce 9.2 inches of rain—at a temperature of 82°. August and September are the hurricane months in the Pacific Ocean south of Acapulco and occasionally the fringe of one will reach Acapulco. Most of the weather, however, comes from cumulus clouds that build up and rain in the mid-afternoon. Some heavy squalls are caused by over-developed thunderstorms called "Chubasco," but they are limited to a relatively small area. Weather reports between Mexico City and Acapulco are about as good as any in the country, so a pre-flight weather check should keep a visiting pilot out of trouble. For comfort, if nothing else, most flights should be made in the morning.

The layout at Acapulco is like something out of a travel catalogue come to life. It doesn't even smell! The town is a busy tourist fishing resort with some of the finest hotels in all Mexico. Rates during the "off" season compare with upper middle-class hotels in the States, but you can't find a room in town at Christmas time. The resort is connected with Mexico City by a good paved highway as well as at least three CMA DC-3 flights daily.

The Pie de la Cuesta Airport is built on a finger of sand between a broad lagoon and the Pacific Ocean. A cocoa-palm plantation grows on the east end of the field and the runway approaches are cut out between tall trees. A short cross-strip takes care of the worst crosswinds. Gas and oil are available in drums.

There are no prepared tie-downs, but the adjoining beach is littered with fair-sized boulders. Local pilots never seem to bother to tie down their planes, but for your own peace of mind, take three empty gunny-sacks with ropes and fill them with sand or boulders as temporary "dead-men" for your plane. Full 52- gallon fuel drums also make excellent aircraft anchors. Those storm shutters on the hotels in town aren't just for fun—and you'll sleep better when the wind begins to whistle at night if your faithful flying steed is safely tethered.

For fishing, hunting or just plain loafing, life in Acapulco is grand. A fleet of private fishing boats are for hire, some complete with gear, guides and beer. Nearby mountains have assorted wild game. And there's always plenty of tropical night life. The Hotel de las Americas, for instance, serves dinner each evening from 10 to 1 A.M. complete with a native Marimba band. Actually, we found ourselves peering around palm trees, wondering where the Hollywood sound stage quit and the grimness that is frequently the tropics began. It didn't "begin" at all.

From Acapulco, we took a side trip that is definitely *not* recommended unless you're flying multi-engined equipment. We headed southeast along the coastline 385 miles to Tehuantepec. Then we flew back up the broad Pan American Highway to Mexico City. The inland flight is fine, but the trip down the coast is a lonesome little stinker. The map shows plenty of airports—16 fields, and they're all marked as emergency strips. The road that shows up on the map just isn't there part of the time. There were stretches 15 minutes long where there wasn't even a grass shack in sight. To make matters worse, the smooth morning weather coincided with high tide so there wasn't any beach for forced landing sites.

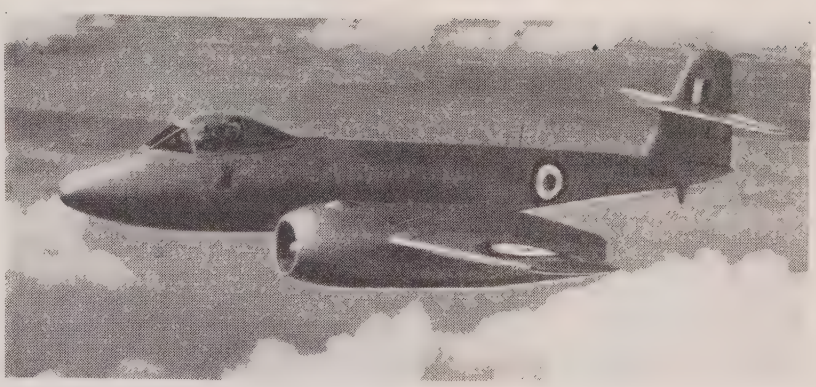
It was later we learned that some of the natives in that vicinity still indulge in extra curricular head hunting!

The huge Air Force-constructed field at Tehuantepec is 10,000 feet long. Before the arrival of each CMA transport, a station wagon drives up an down the strip to clear off the cows. Fuel and weather information. are available but there's no maintenance. Landing fee, 4 pesos.

You can make rather extensive preparations for a Mexican flight or keep them to a minimum. The most important prerequisite is to have your plane in absolutely top mechanical condition. Mechanics and equipment are few and far between except at the largest fields.

It is wise to carry your own chamois strainer for fuel to remove any traces of water or dirt. Tie-down kits are highly recommended. Mae West life jackets should be taken for any over-water flights and a jungle crash kit of some kind is good life insurance if you plan to fly anywhere but in the neighborhood of a highway. Some surplus parachute packs are still available but the tablets and sulfa in them should be replaced with new drugs. A machete is about the only thing that will get you out of the jungle. A few cans of fruit juice and a bottle of water should go in your baggage compartment.

If you are planning a flight to Mexico—or anywhere outside the continental limits of the United States—check both your aircraft and personal insurance policies. Many policies do not cover without a written waiver.



BRITISH have unveiled what they call "world's most powerful jet." This is the Gloster *Meteor 8* interceptor that is powered by two Armstrong Siddeley *Sapphire* jet engines. Just one of these new engines is said to be as powerful as four engines in a Superfort. Plane's endurance is increased, too

For your return flight to the States, baggage carriers on the Municipal Airport at Mexico City have developed a rather lucrative yet helpful service for departing pilots. A tip of 15 or 20 pesos will cover their time and talents for shepherding you through the various agencies and obtaining a flight plan complete with the latest weather information. True, you can do the job yourself, but it'll take nearly half a day. We were on our way with the help of a baggage handler in an hour and a half. It's the best bargain in service we found in Mexico.

Before take-off from Mexico City, you must step in a sawdust-soaked solution of formaldehyde and kerosene to stop the spread of hoof and mouth disease. The wheels of your plane will also be sprayed.

If you have sufficient fuel, a non-stop hop from Mexico City to Brownsville, Texas, 425 miles, saves on the red-tape. It means that you have just one less place to clear since you must notify Mexico City officials of your departure anyhow—even though you may make other stops before reaching the border.

Just after your take-off from Mexico City. you pass over the large dry lake of Texcoco with its huge evaporation plant shaped like a snail. Best lightplane procedure is to follow the broad Pan American Highway through Pachuca and down to Tamazunchale in the low country. There are radio ranges at Tamuin and Ciudad Victoria near the highway as additional navigational aids.

On the day of our departure, the weather was beginning to build up for a mid-afternoon rain and the only way we could get out of the valley of Mexico was to fly northeast toward Tuxpan. It's lonesome country. We flew over numerous villages perched precariously atop razor-edge mountains with cornfields planted in almost a vertical position. None showed up on our maps.

Finally we picked our way around the thunderstorms and followed the Rio San Marcos and Rio Cazones down to the Gulf of Mexico. We flew north over the broad sandy beaches and oil-producing lagoons south of Tampico.

Landing fee at the excellent CMA field was 5 pesos and our flight plan to Brownsville was extended without charge.

The wide Laguna Madre stretches more than half the way between Tampico and

(*Continued on page 38*)

Airway to Acapulco

(*Continued from page 37*)

Brownsville. There are a number of dirt landing strips adjoining fishing camps and little two-man boats with three-cornered sails dot the calm water of the lagoon. Lonesome, yes, but beautiful country.

Here's what the City of Brownsville advises for planes returning from Mexico. The same regulations apply more or less at the seven other U.S. airports of entry; Calexico and San Diego in California, Douglas and Nogales in Arizona and Laredo, El Paso and Eagle Pass in Texas.

Customs and Immigration officials must be notified at least an hour before your arrival. A flight plan from Mexico City will cover. There are no overtime charges for planes arriving between 8 A.M. and 6 P.M. except Sundays and holidays. After regular hours the overtime runs up in a hurry. For example, if you arrive at midnight, you'll pay $21.06 for U.S. Customs, $22.50 for U.S. Immigration, $9.00 for Mexican Officials and $5.00 for a Broker's Bond. That totals $57.56!

Sunday overtime for incoming aircraft before 6 P.M. is $3.15 for U.S. Customs, $7.50 of U.S. Immigration and $9.00 for Mexican Officials plus a $5.00 bond for overtime. Here's where a little flight planning will save a pilot quite a chunk of change when he needs it most—at the tag end of a long trip.

If you have a radio transmitter, call the Brownsville tower as far out as you can. Advise them of your position, estimated landing time and request Customs Officials. When we landed at Brownsville, the late afternoon was hot and sultry and we naturally cracked the *Navion's* canopy as we taxied up to the Immigration ramp. The U.S. Public Health Service man came running out, waving his hands violently. As soon as the prop stopped turning, he shouted for us to close the hatch. Then he stuck a pressurized flit-gun filled with an aerosol solution inside the crack in the canopy and disinfected both us, the airplane and our baggage. We spent a stuffy and uncomfortable—though probably highly antiseptic—three minutes before we could climb out of the plane.

After that the Health Service man escorted us to his office to check our inoculation record. If you don't have one, you're due for a smallpox shot and perhaps a typhus injection. Occasionally Mexican officials give the smallpox treatment before you are permitted to leave Mexico.

Customs regulations have been relaxed recently so that you can bring back up to $500 worth of personal goods without tax if you have been out of the States more than 12 days. Unless you spent it for Mexican silver, there isn't enough room in the average lightplane's baggage compartment to cause any difficulty in this respect. You can save a lot of time in clearing Customs if you'll prepare a list of your purchases to give the Customs Officials. List all purchases and keep receipts whenever possible.

With your first take-off in the States, you'll really appreciate the wonderful weather forecasting, flight-plan service and good maintenance found on almost every airport.

And when the snow falls in the winter and you're sitting around logging enforced hangar flying, there'll be plenty to re-hash about the trials and tribulations, the beauty and charm of a flight south of the border.

BONANZA, utilizing 12-volt electrical system, taxies in with its lights on at the Lockheed Air Terminal in Burbank, California. Landing lights are in wing above the gear

Circuit Maintenance

(*Continued from page 28*)

generator is maintained by the voltage regulator, a current regulator and a reverse current relay, all of which are contained as an integral unit to control the electrical generator output within the current load of the electrical system.

The function of the reverse current relay is to prevent the flow of current from the storage battery reversing back through the generator field windings when the generator is inoperative. The output of the generator must be sufficient to maintain the entire running load and not heat beyond rated temperature. Any increase in the heat of the generator is a sign of a short circuit in the electrical system. Air cooling ducts are provided to induce a flow of cooling air across the generator armature and field windings.

In general, there is little maintenance you can do on the generator other than checking the contacts for proper security and conductivity, and the brushes and springs for proper setting and tension. The charging rate should be noted in flight at normal cruising speed. When the engine is inoperative, check the ammeter on the instrument panel to see if it indicates a discharge. If it does indicate a discharge, check the operation of the reverse current relay, the polarity of the connections, and also check for evidence of a short circuit. Voltage regulators, if inoperative, may have to have their contacts cleaned, but if this does not correct the trouble, a new unit should be installed.

Generators will not function properly when the brushes are not set in the proper plane of commutation, or if the brush contacts are rough. A rough commutator and an open field winding in the armature or stator will also cause generator trouble. Rough commutators should be turned down on a lathe and new brushes should be installed. Open fields in the armature or stator will make it necessary to replace the generator with a serviceable unit. A slight whistle in the generator housing when it is running will indicate a worn bearing. Bearings should be replaced as soon as this noise is evident.

Fuel gages used on lightplanes are suitable for either 6- or 12-volt operation, provided in the latter, a resistor is placed in series with the gage. Each fuel-gage circuit is separately fused, and is only operable when the selector switch is turned on. Readings for fuel quantity should not be made until the indicating needle has stopped fluctuating. This kind of gage operates slowly because of the bi-metal contacts in the gage units. The fuel-quantity gages should be calibrated at periodic inspection and the indication checked at intervals between the annual inspection. For accuracy, the fuel-quantity gages, when being calibrated, require that the plane be placed in a level-flight attitude.

Twelve volts are required to energize engine starters of the direct cranking or combination inertia-direct types. In the former, heavy currents are drawn from the battery to obtain direct torque action. In the latter type, the energy is first stored in a flywheel, and is then released by means of a manually operated clutch which engages a pawl on the engine accessory drive shaft. Direct cranking starters revolve the engine slowly and should not be used continuously for more than 35 seconds without allowing the starter to cool. The failure of a starter to operate may be caused by a weak battery, bad contacts, a rough commutator or an open field winding in the starting motor. Repairs are similar to those described for the engine-driven generator. Both types of starters are vented to dissipate the heat induced by the starting action.

When it is necessary to have an electrical part replaced because it is defective, be certain that no substitution has been made which will not function satisfactorily, or which will cause an increase in the running load. Check to see that the substitution is interchangeable with the original part. When ordering an electrical part, give the serial number, the part number and the name of the part as described in the airplane parts book. It is also useful to include the fuselage number assigned by the airframe manufacturer. And don't forget the recording on the appropriate CAA form when any major change or repair has been made or if the original electrical circuits have been altered in any way. The following of these simple instructions should help to keep those repair bills down and your flying hours up.

First in SAFETY

*The year is 1929** and America is becoming more and more conscious of travel by air. Stanley Switlik is manufacturing parachutes in his Trenton, New Jersey, factory and he's worried. "Can a more efficient method be devised for landing passengers and cargo from airplanes in full flight?"—he asks himself. Then! An idea is born. Why not equip airplanes with trap doors in the belly, then have each seat equipped with a parachute and ripcord attachment. Thus, passengers could be dropped through and gently lowered to earth.

The idea was successfully tried and patented in America and foreign countries. From this dream for emergency exit evolved the present day ejection seats.

Another *first* in Switlik's continuing research for greater safety.

**In November, 1929, "DAS LUFTSCHIFF," published in Berlin, illustrated Stanley Switlik's revolutionary idea as shown here—international acclaim!*

SWITLIK

PARACHUTE COMPANY, INC.

LALOR AND HANCOCK STREETS, TRENTON, NEW JERSEY, U. S. A.

High-Speed Bail-Out

(*Continued from page 23*)

Garnerin made the first public jump on 22 October, 1797, in Paris. His 23-foot canvas chute had a hole in the top to let the air out. Oddly enough, the pattern and shape of his chute was standard design for a century and a half.

Most laymen, and a surprising number of aviators, think that parachuting out of a high-speed jet is still the simple Hollywood technique of standing gallantly in the cockpit, saluting the doomed plane, then gracefully folding the hands for a nice swan dive over the side. Actually, the parachute has come to be only one part of the modern escape mechanism.

So far, the parachute builders have not been able to make an ideal chute for modern combat aircraft—one which would withstand the opening shock of at least 600 mph, open slowly enough to prevent injury to the pilot, and descend slowly enough to allow an easy landing. Many chute improvements have come along in recent years, but none of them can fill all the particulars.

The Germans came pretty close during the war with their "ribbon" chute. As the name suggests, the chute was made of silk ribbons, sewed together in concentric circles. Instead of a hole at the top, the escaping air was squeezed out between the ribbons. This model had several advantages of the "perfect" chute—it could be safely operated at much higher opening speeds; it did not tend to oscillate like the standard chute, and once streamed, the opening snap was less severe on the pilot—about 3 G's as compared to 15 or 16 of the standard chute. But its several disadvantages precluded further development. It was slow in opening—which meant that a low-altitude bail-out would probably be fatal; its rate of descent was 43 feet per second—a man hitting the ground would probably fracture both legs; it was bulky and difficult to construct; and when packed for a long time, especially in damp weather, the ribbons tended to stick together.

In 1947, the U. S. Navy came up with one idea which made progress. An experimental chute was equipped with a six-foot cap attached to the rest of the canopy with heavy elastic cords. At high speeds, the cap opened a gap between itself and the rest of the canopy, the air spilled out, and as the chute slowed down, the elastic bungees drew the cap back into position. With this simple modification, it was found by test that the 217-knot opening speed of the standard chute could be boosted to 430 knots—almost a 100 per cent improvement.

Nylon, of course, was first widely used in parachutes during the war when silk was unobtainable. Obviously, nylon was a lot better fabric—stronger, lighter, more resistant to mildew, heat and dampness, and bugs didn't enjoy eating it like they did silk. More recently, the Navy sponsored development of a new nylon fabric which is even tougher, called "rip-stop" nylon. The only reason the girls aren't wearing it for stockings is that the nylon is woven in a waffle-type weave which would make a shapely calf look like a varicose jungle. To lessen the danger of tearing and shredding, a tough cross thread is sewn into the material every quarter inch. If a tear develops, it tends to restrict itself between threads. This fabric has permitted building a better and stronger high-speed chute.

A good many of the manufacturers of parachutes are no longer hopeful of making a supersonic chute. The time is long gone, they say, when a military pilot can walk out of his airplane with a parachute as his only safety line between sky and earth. Even today, the well-dressed military pilot must wear a G suit, a football helmet, a special oxygen mask, and sit in an ejection seat. For the moment at least, the chute and the "hot seat" seem inextricably tied together—and the designers of 2,000-mph planes are planning on adding a third member to the safety team, the "escape capsule." In other words, aviation has run hard aground on the problem that the machine can dish it out but the operator can't take it. An airplane can be built to accelerate so fast, go so high, turn so quickly, come down so fast, that the pilot would never survive a single maneuver. As a consequence, the designer must plan on taking along, strictly for the benefit of the pilot and only to the detriment of the performance, a reasonable facsimile of surface conditions—enough air, the right temperature, a comfortable range of movements. Why, then, worry about a supersonic chute? The operator couldn't use a better one anyway.

The idea of an "escape capsule" isn't new either . . . not since the first daredevil rode over Niagara Falls in an old whiskey barrel. The Germans were the first ones to try the idea of detaching one part of the plane from the rest, and build it into an actual airplane. Their World War II records revealed one case that proved that no matter how many safety devices human brains create, human nature can beat the system. In flight, this Dilbert inadvertently pushed the wrong button, and suddenly found his airplane coming apart. Even today, as our headlines prove, some pilots land with their wheels up despite howlers, horns, buzzers, flashing red lights, radio warnings, danger flares and a dozen other safety devices. Like taxes and death, carelessness will always be with us.

The "escape capsule," usually the cockpit section, is detached from the rest of the plane by an explosive charge. To actually do this is not as simple as it sounds, for it means that some method of severing electrical wiring, hydraulic lines, fuel and oxygen lines and control cables must be provided. Moreover, the escape egg must fall freely after detachment without spinning or tumbling, or the occupant may be injured, dazed by vertigo, or helplessly pinned inside by centrifugal force. Only when the capsule has slowed down does the pilot hatch out of his nest and make a standard parachute exit.

Chutes are starting to grow attachments nowadays. One of the most important is a barometric gadget which causes the chute to open automatically at a certain predetermined altitude. Another is a time device which releases the canopy after a certain elapsed time. These attachments guarantee opening even if the pilot is dazed, injured or unconscious.

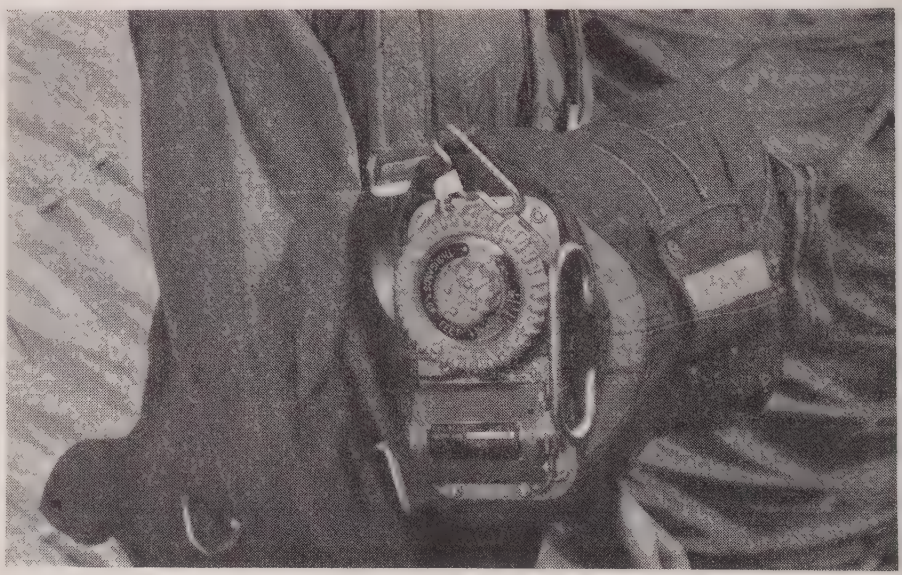
The personal-equipment experts have been hanging gadgets to parachute harnesses since before the war—everything from bombs to boats. The latest addition is a pint-sized radio receiver and transmitter which is no bigger than a man's hand, and which operates on VHF frequencies. Another appendage is a small oxygen bottle to prevent anoxia on the long float earthward.

The standard chute in service in our military forces is still the 3-point attachment chute—two leg straps, one chest strap. During the war the British developed a one-point attachment chute which has been tried by our services but not yet fully accepted. While there is merit in the idea that a one-point release is desirable, especially for an injured man, or for a jump into water or in high winds, there is still great reluctance to accept a harness which might be inadvertently released.

Perhaps the best idea to come forth, however, is the "massaging seat" chute which will be hailed with relief by weary pilots, endurance flyers and those airmen afflicted by cists and Indian underwear. The seat of the chute is connected to the back pressure system of the engine and is equipped with a rotating valve which alternately directs air to various inflatable compartments of the seat, resulting in a massaging action to the wearer's posterior.

The line forms on the right, men.

ANEROID parachute release automatically opens chute at a pre-determined altitude



Production Unlimited

(*Continued from page 11*)

additional orders of Republic F-84E's and Douglas AD's for ground support, and Fairchild C-119's, Boeing C-97's and Douglas 124A's for troop supply. Beyond that, however, it's anybody's guess. Many officials of the Air Force claim our loss of planes in the Korean "war" might reach 150 per month. Contrast this loss to the present delivery rate to the Air Force of 140 military planes per month! That's 10 less than the expected Korean losses.

Our aircraft industry can meet the challenge and overcome the handicap set up by Washington's questionable planning, but . . . the industry must get cooperation from the government and it must receive the decisive support of military planners with foresight. It must *not* be victimized by political programs designed to "sell" economy to the public while national security is abandoned on the altar of votes.

Generally, the expansion potential of the aircraft industry in the event of unlimited production go-ahead can be determined by the so-called "Rule of 3," *i.e.* that monthly production rates can be tripled at the end of one year; that rate tripled at the end of the second year; and the second year's rate tripled at the end of the third year.

The production expansion of the aircraft industry in World War II followed closely the "Rule of 3." In May, 1940, the production of aircraft numbered 450 planes; in May, 1941, the industry was turning out planes at the rate of 1,339 planes per month (year's total was 10,209); in May, 1942, the monthly production rate had jumped to 3,983 per month (total 12 months: 30,630); while in May, 1943, the production rate had jumped to 7,086 per month (total 60,068 in 12 months). Projecting this to the near future and based on existing production rates, the monthly production rate runs July, 1950: 215 military aircraft; July, 1951: 645 planes (total 12 months production, 4,400 aircraft); July, 1952: 645 aircraft (year's total, 15,500); and July, 1953: 5,000 military aircraft per month, with 38,000 the 12 months total.

In World War II, the production rate of 50,000 planes per year was reached 24 months after the go-ahead. To reach that point from our current base would require 34 months, or 10 months longer than in World War II. This projected acceleration from the current 1950 base takes into consideration the availability of adequate plant reserves and adequate quantities of machine tools and critical materials.

It presupposes an effective up-to-date mobilization plan which would provide the industry with sufficient quantities of components, accessories and other elements vital to the construction of modern aircraft. It also presupposes no enemy interference with our industrial system.

Mindful of the delays and shortages experienced in World War II, the U. S. Government has made a substantial effort to correct the deficiencies that showed up in the World War II mobilization plan.

More than 1,000 modern industrial plants were built during the last war. Many of these were sold to private industry, but about 500 of them have been kept under Government control. The Munitions Board already has drafted specific plans to put 253 of these plants on an immediate wartime footing when required. Another 200 plants are in reserve on either a stand-by basis or on the stipulation that they be kept in condition to convert to wartime production within 120 days.

More than 161,000 general purpose machine tools are now in storage. This will permit machine tool makers to concentrate on the production of the special purpose tools that are always so critically needed in the event of full-scale mobilization.

In the matter of stockpiling critical materials, at the end of June there was on inventory more than 1.5 billion dollars worth of materials, with more than 500 million dollars worth in the process of delivery.

This reserve of plants, tools and materials will offset to a large extent the increased complexity of modern aircraft and will permit industry to devote a greater proportion of its efforts to assembling and producing these aircraft. The complexity of the new postwar planes is apparent by comparison between World War II and current types. Today's airplane requires four times as many man-hours as its World War II counterpart. It is twice as complex per pound of airframe weight and (*Continued on page 42*)

AVION IBERAVIA is a two-place training plane constructed of wood and fabric and powered by a Continental 85-hp engine it employs dual controls; is built in Spain

Production Unlimited?

(*Continued from page 41*)

its airframe weight is twice as much. But, it can fly higher and faster than the aircraft of World War II, and is equipped with many new improvements in radar, fire control equipment, etc.

The types of airplanes presently available or in production for the Air Force and the Navy total 73. They are—

Fighters:

- F-47 Republic. WW II piston-engine fighter assigned to Nat'l Guard and in storage. Deliveries completed.
- F-51 North American. WW II piston engine fighter assigned to USAF, Nat'l Guard, and in storage. Deliveries completed.
- F-80 Lockheed jet fighter assigned to USAF, Nat'l Guard. Production nearly completed.
- F-82 North American piston-engine all-weather fighter assigned to USAF. Deliveries completed.
- F-84 Republic jet fighter assigned to USAF, Nat'l Guard. In production.
- F-86 North American jet fighter assigned to USAF. In production.
- F-89 Northrop jet all-weather fighter. Not yet assigned to operational units. Deliveries beginning.
- F-94 Lockheed all-weather jet fighter assigned to USAF. In production.

Bombers:

- B-26 Douglas WW II piston-engine (formerly A-26) assigned to USAF, Nat'l Guard, and in storage. Deliveries completed.
- B-29 Boeing, WW II piston-engine, assigned to USAF and in storage. Deliveries completed.
- B-36 Convair piston- and jet-engine bomber assigned to USAF. In production.
- B-45 North American jet bomber assigned to USAF. In production.
- B-47 Boeing jet bomber. Not yet assigned. Deliveries beginning.
- B-50 Boeing piston-engine bomber assigned to USAF. In production.

Transports:

- C-45 Beech piston-engine WW II transport. Administrative uses. Deliveries completed.
- C-46 Curtiss piston-engine WW II transport assigned to Nat'l Guard and in storage. Deliveries completed.
- C-47 Douglas piston-engine WW II transport assigned to USAF, Nat'l Guard and in storage. Deliveries completed.
- C-54 Douglas piston-engine transport, WW II, assigned to USAF, Nat'l Guard and in storage. Deliveries completed.
- C-74 Douglas piston-engine transport assigned to USAF. Deliveries completed.
- C-82 Fairchild piston-engine transport assigned to USAF, Nat'l Guard and in storage. Deliveries completed.
- C-97 Boeing piston-engine transport assigned to USAF. In production.
- C-119 Fairchild piston-engine transport assigned to USAF. In production.
- C-121 Lockheed piston-engine transport assigned to USAF. Deliveries completed.
- C-124 Douglas piston-engine transport. Not yet assigned. Deliveries beginning.
- C-125 Northrop piston-engine transport. Not yet assigned. Deliveries beginning.

Trainers:

- T-6 North American WW II piston-engine trainer assigned to AF and Nat'l Guard. Deliveries completed.
- TB-25 North American twin-engine WW II bomber now trainer assigned to AF. Deliveries completed.
- T-28 North American piston-engine trainer assigned to AF. In production.
- T-29 Convair piston-engine navigational trainer assigned to AF. In production.
- T-33 Lockheed jet trainer assigned to AF and Nat'l Guard. In production.

Liaison:

- L-4 Piper piston-engine WW II plane assigned to AF, Nat'l Guard, Army. Deliveries completed.
- L-5 Stinson piston-engine WW II plane assigned to AF, Nat'l Guard, Army. Deliveries completed.
- L-13 Convair piston-engine liaison plane assigned to AF, Nat'l Guard and Army. Deliveries completed.
- L-17 Ryan piston-engine liaison plane assigned to Army. Deliveries completed.

Helicopters:

- H-5 Sikorsky, assigned to AF. Deliveries completed.
- H-12 Bell, assigned to AF. In production.
- H-13 Bell, assigned to AF and Army. Deliveries completed.
- H-18 Sikorsky, assigned to Army. In production.
- H-19 Sikorsky, assigned to AF. In production.

Search and Rescue:

- SA-16 Grumman piston-engine amphibian assigned to AF. In production.

The Air Navy lists the following:

Fighters:

- F3D Douglas jet all-weather fighter assigned to Navy. In production.
- F6F Grumman piston-engine WW II fighter assigned to Navy, Marine and Reserves. Deliveries completed.
- F8F Grumman piston-engine fighter assigned to Navy, Marine and Reserves, and in storage. Deliveries completed.
- F9F Grumman jet fighter assigned to Navy and Marine units. In production.
- FH-1 McDonnell jet fighter assigned to Navy, Marine and Reserves. Deliveries completed.
- F2H McDonnell jet fighter assigned to Navy and Marine units. In production.
- FJ-1 North American jet fighter assigned to Naval Reserve. Deliveries completed.
- F4U Chance Vought piston-engine WW II fighter assigned to Navy, Marine, Reserves, and in storage. In production.
- F6U Chance Vought jet fighter assigned to Navy. Deliveries completed.
- F7U Chance Vought jet fighter. Deliveries beginning.

Bombers:

- AD Douglas piston-engine attack, assigned to Navy. In production.
- AF Grumman piston-engine attack assigned to Navy. In production.
- AJ North American piston-engine attack, assigned to Navy. In production.
- AM Martin piston-engine attack, assigned to Naval Reserve. Deliveries completed.
- P2V Lockheed piston-engine patrol, assigned to Navy. In production.
- P4M Martin piston-and-jet-engine patrol, assigned to Navy. In production.
- P5M Martin piston-engine patrol seaplane. Production beginning.
- PB4Y2 Convair WW II patrol, assigned to Navy. Deliveries completed.
- PBM Martin piston-engine WW II patrol, assigned to Navy, Reserve. Deliveries completed.
- TBM Eastern Aircraft Div. of GMC, WW II piston-engine torpedo bomber assigned to Navy. Deliveries completed.

Transports:

- R4D Douglas piston-engine WW II (AF C-47) assigned to Navy, Marine, Reserves. Deliveries completed.
- R5D Douglas piston-engine WW II transport (AF C-54) assigned to Navy, Marine, Reserves. Deliveries completed.
- R4Q Fairchild piston-engine transport (AF C-119) assigned to Marines. In production.

JRM Martin piston-engine seaplane assigned to Navy. Deliveries completed.

R5C Curtiss WW II piston-engine transport (AF C-46) assigned to Marine, Reserves. Deliveries completed.

Trainers:

SNJ North American WW II piston-engine trainer (AF T-6) assigned to Navy, Marines, Reserves. Deliveries completed.

TO2 Lockheed jet trainer (AF T-33) assigned to Navy, Marines, Reserves. In production.

Helicopters:

HO3-S Sikorsky, assigned to Navy, Marines. Deliveries completed.

HO4-S Sikorsky, assigned to Navy, Marines. In production.

HRP Piasecki, assigned to Navy, Marines. In production.

HUP Piasecki, assigned to Navy, Marines. Deliveries beginning.

HTL Bell, assigned to Navy, Marines. In production.

Utility:

UF Grumman piston-engine search, rescue and utility transport (AF SA-16), assigned to Navy. In production.

These, then, are the aircraft on the roster of the Air Force and the Air Navy. It does not include experimental or prototypes currently undergoing tests by both Air Arms.

The size and composition of the Air Force is determined on a yearly basis by the money appropriated by Congress. The Korean "war" in all probability will mean a 70-Group Air Force at last, thanks to sufficient appropriations expected to be voted by Congress.

Should the 70-Group Air Force become fact, it would be comprised of the following groups: 4 Heavy bomber groups, 21 Medium and light bomber groups, 6 Strategic reconnnaissance groups, 4 Tactical reconnaissance groups, 10 Troop carrier groups, 22 Day fighter groups, 3 All-weather fighter groups. In addition, there would be 22 separate squadrons in support of regular AF, 27 National Guard groups, 12,400 modern planes, 8,100 modern planes in reserve, and 5,200 aircraft to be procured per year.

Make-up of the Navy Air Arm, like the Air Force, is subject to some change. However, at the present time, signs point to Naval Aviation's consisting of one air group assigned to each carrier. Normally a carrier air group is composed of four fighter squadrons, one attack squadron, and a composite unit which, depending on the mission, would be composed of night fighters, mine-laying planes, helicopters or other types of aircraft.

In peacetime, both fighter squadrons and attack squadrons are composed of 18 planes. However, during World War II, the planes per squadron were increased to 24. The Korean situation could force a similar revision of numbers now.

Air superiority is the fundamental essential in our national security. Our aircraft industry is capable beyond doubt of supplying the aircraft to guarantee that superiority. It remains for the Government to use foresight and judgment in taking advantage of the expansibility of the industry, and in granting industry the cooperation necessary to do the job. It is the duty of every American to see to it that politics do not hamstring this industry that builds for peace by preparing for war.

The Wee Bee

(*Continued from page 15*)

feet operate rudder pedals in the conventional manner—push left for left, right for right.

The pilot's head is located well forward of the wing's leading edge so that visibility is not impaired. The pilot looks at the instruments in the normal manner and is protected by a large windshield which almost surrounds his head. The safety harness consists of shoulder straps and a waist strap, all released at one point by a push-button control. For quick departure from the airplane, should it become necessary, the pilot merely pushes this release button, and the harness drops away completely.

Prior to flight tests, the *Wee Bee's* structure was tested to the limit loadings for the design. The design criteria was CAR 03 and the airplane is fully capable of meeting the CAR Normal Category requirements. The wing was proof tested by supporting it at the tips, and applying a a load at the fuselage in such a manner as to impose a known bending moment at some intermediate position along the wing. The landing gear was drop tested with a pilot aboard. The airplane was lifted manually and dropped on greased plates through a known height, measuring the acceleration obtained during each drop. Height of drop was progressively increased until the desired energy absorption was obtained.

The center of gravity of the airplane with full fuel and with any pilot, large or small, is 32 per cent MAC (mean aerodynamic chord). All of our flight tests to date have been made at this CG location. However, we have taxied the airplane with the CG 4 per cent each side of the normal position during our first taxi tests.

This SKYWAYS' pilot report was made from the newly dedicated Montgomery Field (formerly Gibbs) on Kearny Mesa near San Diego, California. *Wee Bee* NX 90840 was in position on the flight line, all shined up and ready to go. Ken Coward, Aeronautical Engineer and designer of the *Wee Bee*, is the head man of Ken S. Coward and Associates, and he always gives the little ship a thorough pre-flight inspection. I picked up a standard back-pack chute from the dispatch office at Gibbs Flying Service and walked out to the plane. I weigh 165 pounds and the chute weighs 20 pounds, bringing the take-off gross weight up to 395 pounds for this flight. One of our associates, Karl Montijo, weighs in at 185 pounds and he has flown the *Wee Bee* many times, but naturally the take-off gross weight goes up accordingly.

Ken and I give the airspeed system a routine pre-flight pressure check and then I'm ready to go. Boarding the airplane is a simple matter for any size pilot. With the safety harness secured, I check the controls for direction and freeness, check the brakes for pressure, and check the pushpull throttle for proper operation. We believe we have the starting technique of the two-stroke cycle engine down pat now. With the throttle wide open, spark and mixture properly set, the cylinders are sprayed up the stack and the carburetor is sprayed down the throat with a "Flit"

(*Continued on page 44*)

The Wee Bee

(*Continued from page 43*)

gun. On-lookers get a laugh out of Ken's running around with this implement to do the job, but it works. For safety reasons, the prop is pulled through with a rope and boot. The "target drone" engine starts out with a roar that can be heard all over Montgomery Field.

Ken gives me the high sign when he gets the engine adjustments complete, and I nod my head for the chocks to be pulled. Taxiing out from the line is duck soup in the *Wee Bee* with the use of nose wheel steering and with more than adequate brakes. Visibility on the ground is excellent and it's an easy matter to clear yourself of obstructions and check the wind tee while taxiing out. At the head of the runway there are no mags to check but, with the brakes locked in the parking position, I always take time to check the controls, full throttle rpm, altimeter setting and reading, and the time of day.

With the release of brakes, the airplane accelerates like a scared rabbit. It takes a few seconds for the airspeed to come up to 40 mph at which time I begin to ease the nose wheel off the ground with just a small amount of back pressure on the stick. Lateral control is apparent early in the take-off run and you are definitely flying the *Wee Bee* laterally long before being airborne. Take-off in the *Wee Bee* is always a thrill. Under zero wind conditions the take-off occurs after a ground run of only 500 feet. Stabilized out at 60 mph, which is the speed for maximum rate of climb, the *Wee Bee* grabs for altitude at the rate of 400 feet per minute. On this flight we leveled off at 2,000 feet above Montgomery Field while still climbing just over 300 feet per minute.

Maintaining full throttle the speed jumps up to and will stabilize out at 80 mph in a matter of seconds. The low-speed characteristics are good with plenty of aileron and rudder control right down to and including the stall. The ship stalls power off at 48 mph and breaks away smoothly when approached at the standard deceleration rate of 1 mph per second. It takes no effort to put the ship into a steep 60° banked turn and less effort to keep it there. I can look right down the wing leading edge, pointed at the ground, and watch the ground observers who in turn can see the profile of my entire body outlined against the sky.

Surprising as it may seem, the sensation of flying the *Wee Bee* is very much like that of any other lightplane. At speeds below 100 mph I scarcely feel any breeze at all, thanks to the big windshield. At 100 and above, during dives, the wind flutters my trousers a bit, but that's all. In gentle turns made with aileron control only (fixed rudder) there is no detectable adverse yaw which means that the airplane can be flown "two-control" very nicely. Easing the stick forward, the little ship picks up speed rapidly. Indicating 110 mph there is no control flutter or airplane shake, everything except my trousers is just as smooth as when cruising at 70 mph (cruise at 70 per cent power) using part throttle.

Through pre-arrangement with the airport manager, I let the *Wee Bee's* airspeed stay up around 100 mph while we buzzed the runway, pulled up into a tight climbing turn and got into pattern altitude on the downwind leg. Good visibility makes it easy to check for other airplanes in the traffic pattern. After a quick glance down at the wind sock, I reduced the power and turned on base leg, keeping the approach speed at 60 mph. The approach in the *Wee Bee* is no different from that of any other lightplane with comparable wing loading; however, on some approaches we have had difficulty with the target drone engine surging and backfiring at reduced power settings. Over the fence at 60 mph you can start to ease back on the stick, holding the ship off the ground with increasing up elevator until touchdown occurs. The spring steel main gear makes every landing a good landing no matter if you happen to drop the ship in from four inches or four feet. Landing contact is made at 50 mph, and even though my eyes are only three feet off the ground it doesn't seem fast at all. As soon as the airplane's speed reduces, I get on the brakes and the ship comes to a stop in 400 feet. Taxiing back to the line can be made at a rather high taxi speed because of the inherent ground handling stability, good steering control and hydraulic brakes.

To emphasize the airplane's small size, I taxied the *Wee Bee* up to the line and parked between and under two of Gibbs Flying Service's new Cessna 140's . . . and the Cessnas were parked in their regular positions on the line—wing tip to wing tip. As a final check prior to shut down, I engaged the parking brake and checked the full throttle rpm of the engine. The crowd that always gathers around the ship started to come in, so I immediately reduced the power and cut the switch. I released the safety harness and kneeled off the ship.

As I walked into the field operations office with my parachute, Ken Coward, the engineer, started pumping me for answers. I always make it a practice to get together with Ken and other members of our ground crew immediately after flight to discuss the results of the flight before they slip my mind. In the *Wee Bee*, all data is strictly from memory. Besides the watch, airspeed, altimeter, rate of climb and engine rpm instruments, we have had the airplane instrumented with an accelerometer and an elevator-position indicator.

Our corrected flight-test data indicated that the original performance estimates for the airplane were optimistic. This is because the propulsive efficiency data used in the original estimates were for low propeller rpm which did not include the effect of high tip speeds. I'd like to say a good word here for the little Sensenich propeller that Sensenich Brothers made up for us at special request. The chief engineer at Sensenich advised us that wood propellers operating at very high speeds (as in the *Wee Bee)* demonstrate considerably poorer propulsive efficiences than indicated by the usual propeller charts and tip speed correction data.

Stability and control characteristics appear as predicted. The airplane is statically stable laterally in spite of the geometric zero dihedral. Longitudinal stick forces are low. Greater static stability both longitudinally and directionally would be desirable. We have checked the short period dynamic stability about all axes and found the airplane response to be essentially "dead beat."

WEE BEE looks like a toy when displayed beneath wing of Convair's giant XC-99. The prone pilot is Ken Coward, *Wee Bee* designer

I might point out at this time that I recently flew the *Wee Bee* in an official demonstration flight for the Air Force represented by Lt. Col. Carl Jackson USAF from the Los Angeles office. He was impressed with the flight and will send his report to the Commanding General, Wright-Patterson Air Force Base, Dayton, Ohio.

Four pilots have flown the *Wee Bee* to date; however, flights are now being held to a minimum because of our powerplant. That little target drone engine is as precious to us as a little gold nugget is to a prospector. It wasn't designed to last forever. In fact, the average life of one of these engines is about 20 minutes once a Navy firing crew trains its powerful guns on a target drone.

The local CAA administrators have cooperated wholeheartedly with us and have shown considerable interest in the *Wee Bee*. If a certified ATC'd engine were available in this power-weight class, there would be no stopping us in making this good little airplane available to the aviation minded.

The *Wee Bee* design progressed methodically and logically from the primary theme of smallness and simplicity, conforming at all times with the rigid requirements of pilot operation, structural and aerodynamic design. The *Wee Bee* airplane demonstrates that small size and extreme simplicity do offer attractive possibilities. The experience gained via the *Wee Bee* most certainly will be put to further tests in projects yet to come.

Combat Crew

(*Continued from page 13*)

gator relays last-minute changes in wind and course to the bombardier in rapid takes. This information is fed into the bomb mechanism and slight but increasingly frequent changes in the motion of the aircraft signal the end of the run. Then—bombs away! Like all SAC missions, the conditions are as near combat as possible—only the actual shooting is missing.

Though more valuable experience is gained in long-range over-water and arctic missions, many training flights of four thousand or more miles are made within the borders of the United States. A typical mission of this type might require a midnight take-off from MacDill Air Force Base in Florida with 10 cities or industrial complexes on the target agenda. Areas of Pittsburgh, Detroit, Cleveland, Chicago, and Kansas City might pass over the radar scopes during the mission. It makes no difference if the target stands out clearly in brilliant sunlight or is buried under five miles of soup and darkness. SAC bombers are equipped to bomb either way.

Bombing results on such missions are recorded by automatic cameras which photograph radar scopes the instant the "bombs away" is sounded. These radar photos are later assessed to determine where the simulated bombs would have landed. If it is beyond a "certain distance," there had better be a good reason in the Strategic Air Command. That "certain distance" is a closely guarded secret, as are the bombing results currently being achieved, but a clue that it's not far from the target might be seen in a statement by the SAC Commander: "We are getting better results from far greater altitudes than we did in World War II," he said recently.

General LeMay attributes the improvement in bombing accuracy partly to new equipment but mostly to the high degree of professional skill on the part of crew members and their ability and willingness to combine their skills under the leadership of the airplane commander to find and hit targets.

The pressure of war did not permit time to train crews to specialist precision in the early 40's. Today, the increasing complexity of equipment necessary for accurate blind bombing, for example, requires the radar operator and bombardier to be top-notch electronic experts. These are but two specialist functions. Gunners must master remote-controlled turrets utilizing computing devices more intricate than any commercial computing machine; and a combat crew navigator will tell you the old yardstick of perfection "Airline Precision" doesn't measure up to SAC navigation requirements. The airlines follow well-defined routes with light lines, radio beams and beacons, DF facilities, and well-lit cities to guide them. SAC simulated combat missions are frequently off the beaten path. The range capability of a modern bomber and the war requirement of flying into distant blacked-out areas devoid of navigational aids require the navigator to be a cross between an octopus, a mathematical genius and a seeing-eye dog. Information from the radio and radar operators, the pilot and bombardier must be translated instantly by the navigator into exact position reports, whether the aircraft is flying over Mount Fujiyama or the north pole. SAC navigators live by the slide rule—you can't find targets in the soup with a crystal ball.

Flying the "big jobs" is a full-time proposition. Consequently, many controls and instruments handled by the pilot or co-pilot on smaller aircraft are the responsibility of the Flight Engineer. He operates in an "office" paneled with dials, switches, gages, colored lights, engine controls, fuel-consumption graphs, exhaust analyzers, propeller controls and the dozens of other gages and gadgets necessary to keep the fans going.

Before starting engines on the B-50, for example, the Flight Engineer performs 36 separate checks and operations, at least half of these can be multiplied by four as the controls for each engine are checked separately. On a 10-minute flight around the field, the Engineer would either check or operate instruments and controls more than 300 times during five separate check sequences. The B-50 pilot after completing a measly 50 separate operations might taxi onto the runway with a handful of throttles, but he never pushes without a last-minute "let her roll!" from his Flight Engineer.

Jack-of-all-trades on the big birds is the crew chief. Keeping 14,000 or more horsepower at the pilots' fingertips is a complete job in itself. But in addition to this the crew chief does general maintenance on all parts of the aircraft, supervises servicing and refueling, checks and regulates the electric, fuel, oil, hydraulic, and heating systems. During and after take-off, the crew chief stands by the pilot and flight engineer ready to apply his wealth of technical knowledge instantly if an in-flight emergency should develop.

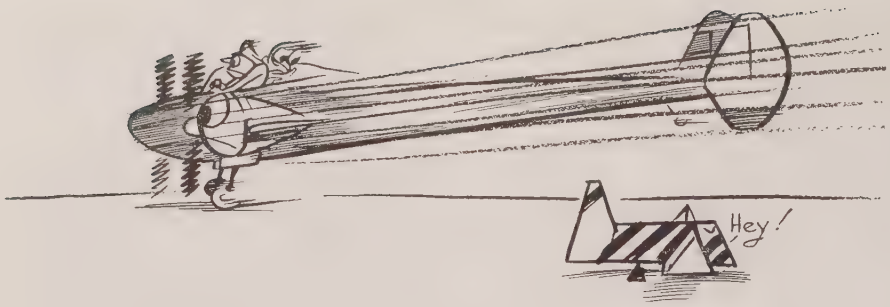
When civilization is a thousand miles astern and land under six miles of cloud and rain, as it often is when SAC bombers fly, the radio operator maintains the lifeline of communication with the outer world. At intervals throughout the flight, he receives and relays weather information and flight data. The radio operator must work in close cooperation with the navigator making radio fixes and bearings when ground aids are in range. At the climax of every flight his greatest pleasure is to hammer out the terse symbol for "bombs away."

There is little comfort in the pressurized compartments jammed with equipment ranging from a four-gun turret to a gasoline "putt-putt" and at high altitude with heaters going full blast it is sometimes bitterly cold. But the modern bomber is not built for comfort. It's a fighting machine stripped of everything except fighting and emergency equipment. Because of this, on flights of long duration, the crewmen frequently operate in shifts, but sleeping in the B-29 and B-50 is a difficult proposition. In both aircraft, the tunnel over the bomb bay and the aft compartment floor are the only places to stretch out. Strict regulations require SAC crewmen to wear parachutes at all times. Though this adds to discomfort it is essential to safety. All the bombers have electric plug-in warmers and carry large thermos jugs of hot coffee. Crew members who can't look a can of "K" rations in the face on the deck agree that at 30,000 it's every bit as good as filet mignon.

Missions range from 15 hours upward on the B-29's and B-50's to 40 or more hours on the giant B-36. In case air refueling is used, the flight time could be doubled, tripled, or just plain, as one airman put it, indefinite.

The longest bomber flight that has been made public was that of a B-50, "Lucky Lady II," around the world in 94 hours. This was no stunt. It was a test of men and equipment. If one bomber can do it, so can a fleet of bombers. Four separate rendezvous were made in four different parts of the globe between "Lucky Lady" and her air tankers as she covered more than 23,000 miles. Flights of this length give rise to speculation that bombers could converge simultaneously from all four directions of

(*Continued on page 47*)



Dilbert

(*Continued from page 32*)

were qualified instrument pilots, so that wasn't too bad. Something had gone wrong with their radio, however, which left them a bit uneasy about other possible aircraft in their vicinity.

Because of this combination, my friend decided to set down at a large field about 40 miles from home. Visibility was 300 feet as they circled the airport hoping they would not intercept anyone else who had been cleared to land.

"I guess this was our lucky day," he said for shortly the tower became a green light at us. Our landing check-off was completed except for the wheels. I dropped them as I turned into my final approach.

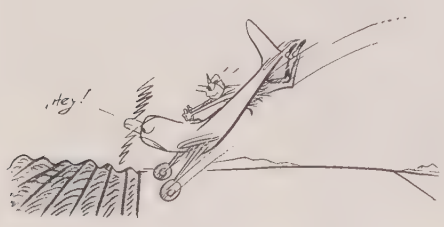
"About this time my co-pilot shouted something which I didn't understand. A few moments later he shouted again, but I was too busy to look at him, and his message still didn't register. I knew I was fast when I crossed the boundary fence. She wouldn't slow down, so I greased her on at midfield. By using full brakes, I managed to stop just a few yards beyond the end of the 6000-foot runway.

"When my co-pilot pointed to the wind tee, it hit me full in the face. Jumping Jupiter! I had landed downwind; a strong 20 miles, at that!"

Well, my rusty downwind friend, when you think of what might have happened, it really was your lucky day. The hardest thing to understand, however, is the resigned attitude of your co-pilot. Either he has a vacancy upstairs, or you had him over-awed. A bit of both, I gather.

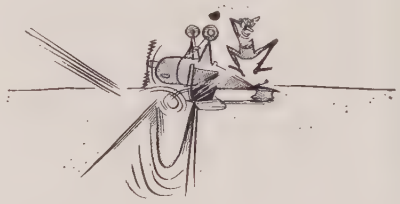
I'm sure this near miss was a good lesson to you. Here's hoping it will help many others. Certainly your resolution on what to do to avoid a repetition should be standard doctrine for all two-pilot jobs.

Before take-off, have an understanding with your co-pilot that seniority is no cover for stupidity and that at all times a positive wave-off should be given when the senior pilot makes an error.



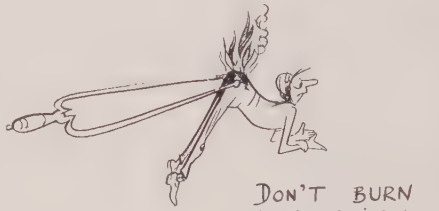
Emergency Reactions—Dilbert got a little bit lost one day during perfect visibility. By the time he oriented himself again, he had only an hour's supply of gas left; not enough to reach home.

Although there were three large airports within a radius of 15 miles, quick-as-a-fox Dilbert landed at the nearest emergency field. Having landed there once before, he didn't even bother to drag it. He barged right in; made a good landing too, but that didn't keep him from turning over when he hit the part that had been plowed the week before.



Then there was that other witless pilot. He was sailing blithely along when he suddenly noticed he had only 10 gallons of gas left. Right then he whipped around and made an emergency landing in the nearest pasture. When he hit the drainage ditch which crossed the field, it must have jarred him awake, for he crawled out screaming.

These weren't screams of pain; they merely registered his realization that the emergency landing had been entirely unnecessary. You see, this aviator had piled up beaucoup hours in DC-4's, but this was his first flight in a Piper *Cub*.

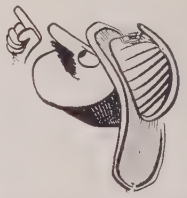


Get Down Or Get Out—Two pilots were singed around the edges recently because they apparently did not realize the seriousness of fire in the air.

One pilot flew past two emergency landing fields in an attempt to get into his home field. The other pilot had a chance to make a straight-in approach, but made a complete circle of the field with his plane on fire. As stated, both of these boys suffered burns. They were lucky at that, the way these emergencies were handled.

An airplane on fire is nothing to fool with. When that happens, there are only two things to do—either *land immediately*, or *bail out*.

Here's another little tip. If you are making an emergency landing with a serious fire condition, do not lower your wheels. You will stop quicker and get out faster if you make a belly landing. Also, in many types of planes, lowering the wheels creates drafts through the plane which increase the fire and tend to bring it into the cockpit.



1. When two similar type aircraft are on crossing courses at approximately the same altitude, which aircraft must give way?

2. If necessary to bail out in a spin, on which side should you leave the cockpit? Why?

3. During an X-C flight, an extremely low pressure area lies directly across your path. Should you alter course to the right or left to avoid it?

(Answers below)

ANSWERS

1. Aircraft on the left shall give way. Stated another way, it is your responsibility to take avoiding action when aircraft are on your right side. Personally, I never argue with anyone over right-of-way in the air.

2. Toward the inside of the spin, to avoid tail surfaces which will be on the outside of the spin.

3. To the right for all headings. The rotation of winds about a low-pressure area is counterclockwise in northern latitudes. Hence, by passing to the right of storm center, you may expect favorable tail winds.

PICTURE CREDITS

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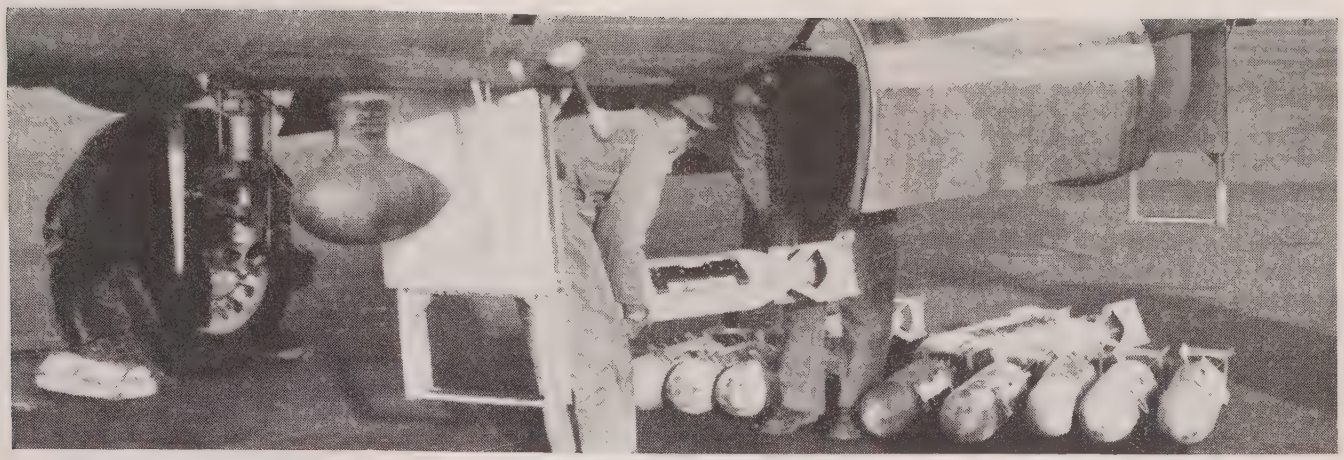


STRATEGIC AIR COMMAND ground crewmen load practice bombs into bomber's bomb bay. "Target" may be as much as 15 hours away

Combat Crew

(*Continued from page 45*)

the compass on a "must" target. It is doubtful if any air defense set-up, no matter how highly organized, could cope with such a situation.

Due to the fact that its bombers range over barren and deserted lands much of the time, Strategic Air Command has devoted years of research and experiment to give the best of protection to its bomber crews. Each aircraft carries survival equipment capable of sustaining a crew in any area of the world, in event of a crash or forced landing. Several large rubber life rafts are provided in addition to one-man rafts and Mae Wests for ditching at sea. Smoke bombs and a variety of signalling equipment for use on land or at sea are standard equipment, as are emergency waterproof radio transmitters. First aid packs for treating combat casualties or injuries sustained in a crash landing are lashed to bulkheads. Highly concentrated rations are included in emergency packs. Special survival rifles are carried to augment rations with fresh meat or fowl. Fishing equipment, snow axes and mosquito nets fill odd corners of the packs. Desert, jungle and arctic survival are taught the men of every SAC crew prior to their "combat ready" qualification.

To further insure protection, every conceivable emergency situation has been anticipated and SOP's developed to cope with them. In event of fire in the air, crash landing, or ditching at sea, every man has an assigned position and a job to do. Drills are held on most training flights. One sharp command by the pilot into the interphone initiates a complete sequence of action, as crewmen execute the drill with swift precision.

Within a minute of the command "Fire in number one!" for example, the fuel and switches to number one engine have been cut, the propellor is feathering and fire extinguishers are in operation. Crewmen not required in the operation, line-up to bail out, should the fire become uncontrollable. Of course, these procedures are simulated, but crew drills are played for keeps—when you are riding 75 tons of aluminum, high octane gas, and bombs at five miles a minute, the first mistake in an emergency could be the last.

The life of a crewman is far from easy, for SAC is a global air force. The missions are long and tiring and the precision demanded by the Strategic Air Command Chief keeps every man at his level best.

Not long ago a group of crewmen were batting the breeze in the ready room of a Strategic Air Command base. One of them, who was idly studying a world map, flicked away his cigarette and remarked: "It's a helluva note, practicing, always practicing, but I guess there's a good reason."—A teletype in a corner chattered a sudden interruption: It was a terse "Operational Urgent" message from Headquarters: "WARNING ORDER: THE BOMB GROUPS WILL PREPARE FOR IMMEDIATE MOVEMENT TO —— BASE IN THE PACIFIC THEATER FOR COMBAT OPERATIONS AGAINST NORTH KOREA COMMUNIST MILITARY FORCES PERIOD AMMUNITION BOXES WILL BE FULL AND GUNS HOT PERIOD FULL COMBAT EQUIPMENT . . ."

The bombers taxied out clumsily, nose to tail, like elephants in a circus parade. At the end of the runway they stopped, swung quartering into the wind, then at precise intervals, turned and roared off into the darkness, heading over the Pacific towards Japan and the targets beyond. It was "business as usual," only this time something new had been added, this time there would be some shooting.

Operation Zero-Zero

(*Continued from page 19*)

commissions. Such experienced personnel have become the key figures of the ace GCA crews.

The advantages are obvious. They know the problems of the pilots to whom they are giving information. They know how important even one- and two-degree headings can be. And what's more, any top-notch GCA crew in Alaska will give one-degree heading corrections and 10-foot glide path reports to a pilot on final. At Adak Island, in rather choppy air and considerable wind aloft, the crew taking our flight down gave the pilot, "Si" Seibert, his drift-corrected heading for final within 7° while we were still on base leg.

Several thousand miles away, while northbound out of Great Falls, Montana, Lt. Paul DuPree of the 1271st Air Transport Squadron made a CAVU run for me at Fort Nelson.

The Fort Nelson crew was a liaison unit out of Edmonton controlled by the 1851st AACS squadron. When we came in over the runway about 50 feet left of the center line, DuPree commented, "They must have a green crew at work today, making practice runs in good weather."

We checked later, and sure enough, a new crew. DuPree added, however, that the 50-foot centerline error wasn't the clue, as it happens on occasion in the best of family gatherings. "A pilot gets so he can tell which crew is on when it's CAVU. And in bad weather the first team handles all critical approaches."

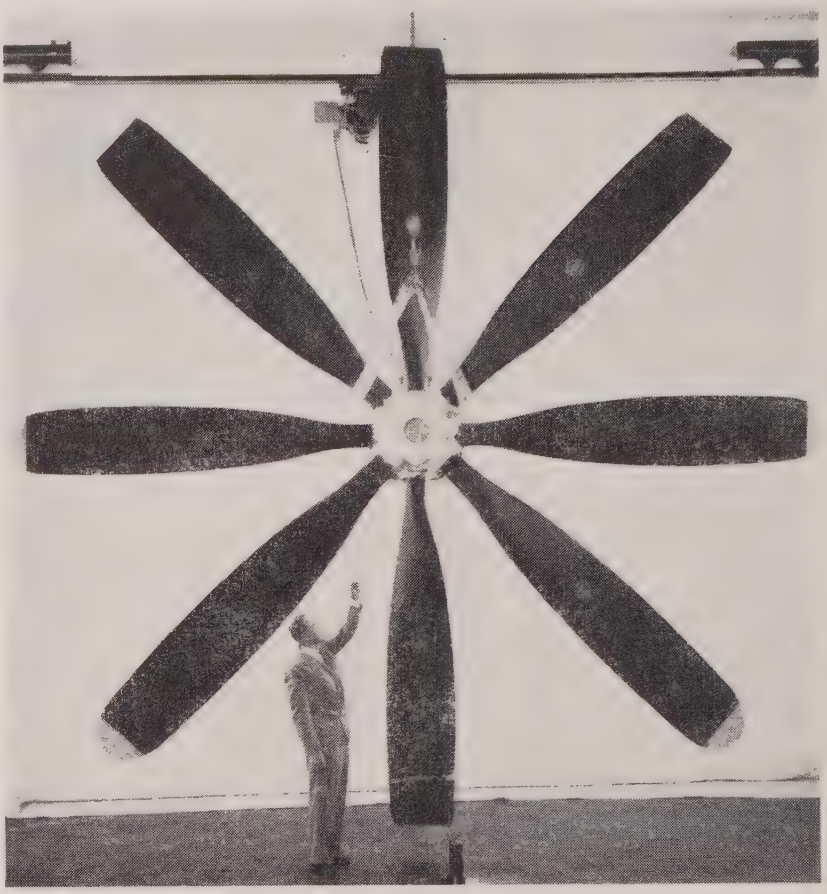
It was here, by the way, that another pilot made the classical and definitive remark on the Air Force's attitude regarding arctic weather flying. Lt. Hal Basham of the Air Force's *Flying Safety* magazine asked a MATS (Military Air Transport Service) pilot in Fort Nelson Operations how the weather was at Fairbanks, some five hours of C-54 flight north.

Pilot said, "I haven't checked the weather yet, but it doesn't make any difference what it is, we are going on schedule anyhow."

At that time, Continental MATS had been stripped of men and planes for the Berlin Air Lift, the 1271st Squadron of the 1701st Military Air Transport Group was flying a daily round trip from Great Falls, Montana, to Anchorage via Fairbanks five days a week, and via Tacoma, Washington, the other two days, plus two weekly trips down the chain to Adak Island, with eight regular crews and five airplanes, one being constantly in the docks for a 1,000-hour overhaul. They were in the process of running up a record of over 100 northbound departures on schedule.

On the Aleutian Provider runs especially, out of Tacoma, they were completely dependent on AACS westbound from Elmendorf, and without GCA magic the whole operation would have come apart at the seams.

Under the Alaskan Air Command, the AACS headquarters at Elmendorf is classified as an independent group which functions under the same command authority as a Wing. Here you see the long-range planning which typifies the whole Alaskan Command under the very able Lt. General Nathan F. Twining.



Curtiss-Wright Octoprop

This isn't a trick shot, but it is an actual photograph illustrating the size of Curtiss-Wright Corporation's new "Octoprop." Towering two stories above floor level, this eight-bladed dual-rotation propeller makes a midget of the man standing below. Designed for a turboprop engine of from 10,000 to 15,000 hp, the new "Octoprop" already has begun a program of testing at Wright-Patterson Air Force Base Dayton, Ohio. Fitted to an engine of appropriate horsepower, the "Octoprop" has a rated thrust greater than the force required to lift a four-engined DC-6 type transport off the ground.

AACS can jump into Wing level on a moment's notice and continue to place highly skilled personnel in all GCA units during a period of mushroom growth with reserve officers upping from the ranks to command positions.

This applies to all other AACS functions, too. And the number of men assigned to various detachments are placed in accordance with the amount of traffic under a program that will develop the greatest number of trained personnel possible under the tech order limitations.

Elmendorf headquarters is also responsible for checking all new AACS men out in the Alaskan Theater, a routine procedure for every other outfit under Gen. Twining's command.

AACS' primary function is to command all air navigation and navigational aids of electronic nature pertinent to the safety of aircraft operation.

They parallel CAA operations to some extent, and on other routes they function independently. On the chain they are "it." Pilots of Northwest Airlines share the Air Force pilot's enthusiasm or the GCA and AACS traffic personnel down along that windy chain at Cold Bay, Adak and Shemya. One grey-haired Northwest Captain said, "I don't see how we could function on the run to Tokyo without that AACS crew at Shemya."

Considering the stateside quibblings over GCA in airline operation, this rank heresy must have come straight from the shoulder. At any rate, AACS gets a thank you card each Christmas signed by every Northwest pilot.

Of course, AACS has its own group aircraft for pilot proficiency training and these are always used in direct training of all other personnel. When new GCA operators are assigned to the theater, skilled though they may be, they are given a series of training runs by AACS pilots on the company's aircraft to see how they stack up to Alaskan requirements. They don't rate them "excellent," "good," "fair" or otherwise. Fair or otherwise won't do.

Also, new men get the normal "training runs" doubled over Stateside requirements prior to being assigned a place in the GCA shacks. One hundred and fifty as compared to Stateside's 75.

Usually, each base operational has a single unit, but at Shemya, on the end of the Aleutian chain and key pivot on the Tokyo circuit where high winds are Standard Operating Procedure, they maintain two Ground Control Approach units.

A special weather observer is based here, too, and he is on duty at all times when the weather is what they call operational—3 miles and 1500 feet or less.

Hardly a week goes by without at least one "catch" at one-eighth of a mile and 50 feet.

Except for new men in training, which number will vary from time to time, a standard crew consists of six operators, three mechanics, one officer and a civilian tech-representative of the manufacturer with each unit.

New electronic developments promise soon to make GCA operable on any and all runways at the flick of a switch and also to remove the GCA shacks from the edges where, admittedly, they do stand a chance of getting clobbered if circumstances happened to combine adversely with no-visibility weather.

It would be hard to imagine a more reliable final approach control. When first picked up over the range, you are advised by the long-ranged operator to break off and make a procedure climb back on the range anytime contact is lost for 30 seconds. When taken over by the final controller, you pull up and make a procedure exodus if you lose contact for five seconds. This way no pilot can sit there fat, dumb and happy if mal-functioning radio has taken him out of control with the GCA. It fails "safe," dependent upon pilot initiative, of course, but admittedly no electronic device has been developed yet that will completely substitute for brains.

When a pilot gets on final and the GCA controller finds that he has gotten far beneath the glide path and doesn't make necessary corrections within safe time limits, they give him a go around in a hurry. You can't plead that you didn't hear it, because if you don't hear anything for five seconds you are required to initiate emergency pull-up action.

When you are 50 feet high and 800 feet out, Ground Control Approach will usually send you around if an unpredictable cross-wind swirl moves you 100 feet off the center line. This assumes, of course, that you are not yet VFR. Once VFR, it's the pilot's responsibility.

Most AACS men agree that the toughest job of all concerns the jets being flown in Alaskan weather by the 57th Fighter Wing at Elmendorf Air Base. Here the pilots often come home without enough reserve fuel to make any "second" approaches. This in itself is a pretty good indication of how the boys respect the electronic wizards in AACS. In fact, there's many a Jet Pilot who owes his state of health to the boys in the GCA shacks.

There's no difference between being reckless and being confident, and once you have seen the jets come home through overcast six miles high you realize that radar has given the term "all-weather flying" its true meaning.

Airport with Profit

(*Continued from page 17*)

oil, $22,000 for labor and parts, and a payroll of $50,000, exclusive of the management's take.

Like many another private airport, Sunny South cashed in on the GI training program, and like the rest, it expanded its facilities during that period. Since 1947 it has built and equipped a $30,000 restaurant, bought $60,000 in aircraft and $12,000 in hangar and ramp equipment, put $15,000 in a pilots' ready room and office and $30,000 in T hangars.

Unlike the others, however, its building program is continuing. Although GI training is ended so far as airports, including Sunny South, are concerned, the field this year will take a minimum of $108,000 in student instruction.

This is a good business. It is important business as applied to private airports, and the causes and effects of Sunny South's activities are worth the close investigation of anyone interested in lightplanes at a time when personal flying is parked on Doldrums Boulevard waiting for the bus to the end of the line.

There are those who may say that young Bob Uricho just fell into a good thing. It certainly helped that his father didn't mind indulging the boy his whims, so long as they made sense.

Dad Uricho, like many others, started coming to Miami in winter months, his son tagging along. Ten years ago when Bob was 24, he started to take flying lessons at the very field he now runs. Then came World War II. For three and a half years Bob was flight instructor and check pilot at Ft. Sill, Oklahoma.

At the end of the war, young Uricho looked about to decide what to make of his life. He had no yearning for his father's hotel business. His uncle, George Uricho, pointed out to him an opportunity tailor-made to his interests.

During the war, Uncle George and Bob Uricho Senior recognized the possibilities of Miami's future and took a flier in a real estate deal. They purchased 260 acres of property. Eighty acres of this land included Sunny South Airport.

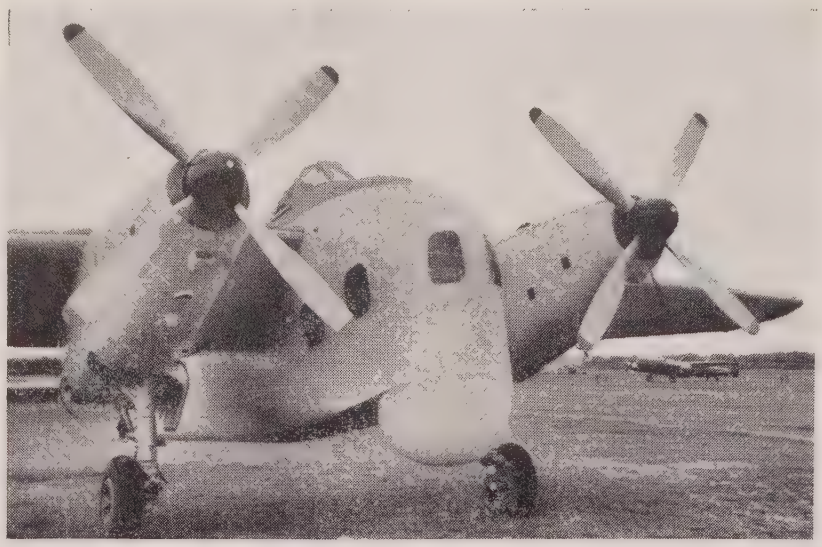
Soon they found they were realizing a handsome profit on the property, even if they did not sell the airport site as a housing development. And Uncle George pointed out to young Bob that there could be a considerable profit in flying as well.

Young Bob was all for it immediately. He asked, "How about it, Dad?" And the father replied in effect, "Go to it!"

The boy did, but slowly. For a year he operated the airport the way it had been run in the past. He made no changes, instituted no reforms, started no promotions. The 12 months were devoted to studying potentialities and laying plans. Finally he was ready. The whirlwind was created, and it has been building up ever since.

Maybe he was lucky. But you can't take it from him that he is a hard-headed businessman who knows where to find a profit and to make a bargain. And you can't take it from him that in Sunny South he saw what he regarded as three prime requisites for successful operations.

(*Continued on page 50*)



DUMBO is a new experimental sub-chaser designed and built by Great Britain's Short Brothers & Harland, Ltd. This bulky droop-snoot airplane is officially designated the Short S.B. 3. Its performance details and specifications are still restricted

New Farnborough SBAC Show

NAVY FIGHTER, the *Wyvern,* is a strike fighter armed with rockets and carrying an air torpedo. A turboprop plane, the *Wyvern* was one of 58 new model military aircraft on display at Farnborough. Russian airmen were not invited to SBAC display

Airport with Profit

(*Continued from page 49*)

Those three requirements as he saw them in order of importance were 1) availability of surface transportation from the airport, 2) weather for maximum flying time and 3) concentration in the area of wealth, interest and leisure to fly.

How he got more advantages may be explained in the case of Colombian civil aviation. You may recall that British and American air lines took over the air operations of that country from the Germans during the late war. Since Colombia is so rugged, virtually all transportation there is by air. Air transportations is on the increase, and present Colombian air lines are trying to replace personnel with their own nationals.

Without civil aviation schools of their own, Colombians looked around to see what the rest of the Western Hemisphere had to offer in the way of instruction. After looking over all possibilities, the Colombians chose Sunny South at Miami. They figured a United States commercial pilot's license would be more valuable, and that it would be more economical for them to come to Miami, where they would not be grounded money-consuming days by bad flying weather.

These lads from Colombia even extended their research into requests for information from the United States Weather Bureau, and learned that Miami has full flying visibility 97 per cent of the year, with only one per cent closed. Within the last year 40 Colombians have obtained their commercial pilots' licenses through Sunny South, and usually there are 10 more under instruction.

The Colombians, like youths anywhere in the world, are enthralled by jets, the speed of modern military aviation and the concentration of activity in Florida, while airport instructors are happy that the state's flat terrain and numerous open space make emergency landings easy.

Augusto Delgado, swarthy, wiry and intense, recently had an adventure which involved both these points. He was on a solo cross-country training flight in the northern part of the state when weather closed in. Solution to the problem was simple. He merely dropped his plane on to the hard. sand beach and calmly waited for a squad of Coast Guardsmen to escort him to the Navy's Banana River guided missile base.

Naval officers invited him to dinner, entertained him that evening, put him up in their quarters overnight, gave him breakfast and sent him back to his plane the next morning. It was the high point of his young life, and he became the envy of all companions until they were introduced as a group to the Blue Angels, a team of naval reserve jet pilots who perform close formation aerobatics at 600 mph.

The boys agreed, however, that a Colombian newspaper got a little off the beam when it carried a photo of them posing with the Blue Angels. It described them as conferring with United States jet pilots on ways and means to blast Red flyers out of the sky.

While a caption writer on that newspaper may have stretched his imagination to the point of a diplomatic embarrassment, Uricho has developed ideas for his airport which pay off in cold cash. Most of them are based on the resort character of Miami and how a chartered plan from Sunny South can add to the enjoyment of vacations in the only tropical area in continental United States.

Much of Uricho's charter business in the winter and summer consists of taking flying enthusiasts to spots where fish are so hungry they try to bite hunks out of a plane's pontoons. Uricho happens to be an avid angler himself, and during jaunts about the area has found more than one spot accessible only by amphibian where the fish bite like nobody's business.

Charters for fishermen who want to fly to Bimini or the Grand Banks are common, and in the fall, hunters are flown into remote parts of the Everglades for quail, pheasant, wild turkey and other game.

Hunting and fishing expeditions by air, however, are as nothing compared to the business Sunny South is doing in aerial ambulance service. As many as six calls a week are received to carry injured or ailing persons as far north as Toronto and as far west as Kansas City.

A Cessna 195, equipped with an ambulance bed, is arranged to permit another passenger and nurse to make the trip with the pilot. So many calls were received during last winter for this service that Uricho found it necessary to purchase a larger twin-engine craft to supplement work of the Cessna.

Just so there will be no chance for any of the hired hands at Sunny South to be idle, the airport does a brisk business in dollar rides week-ends when regular students are not using planes. The airport loses money on these trips, but figures it gains in the long run. Uricho's bookkeeper discovered that 40 per cent of the dollar riders become so enthused they return for private pilot and commercial licenses.

HOPPICOPTER, the one-man helicopter that's powered by a motorcycle engine, is being produced by Hoppicopter Company in England. Within a year 850 of these machines will be produced a month and exported all over the world. It cruises at 50 mph, and will sell for about 500 Pounds (around $1500). The *Hoppicopter* is expected to have many uses: oil companies have expressed interest in it for surveying pipe lines in desert areas. It could be used for spraying

Meanwhile, the use aerial visitors make of Sunny South is so great research statisticians for a period checked the private airport at the same time they phoned the railroads and air lines to get a line on travel into the city.

Such statistics, however, were discovered to be not too certain, since they often reflect several flights by one person or group. People like Arthur Godfrey, for example, hop between New York and Sunny South like popcorn on a griddle as they divide time during the week between commitments in the North and living in the South.

These are the ones who have money to spend on planes, and a use to which to put their aircraft, and Sunny South is on hand to sell them. Miami's scenery from the air is as spectacular as it is from the ground, and the combination of perfect flying weather, flat terrain for easy forced landings and other conditions become powerful arguments for private aviation.

Miami's sudden industrial expansion at the same time is reflected in business aircraft sales. More than 800 manufacturing plants have sprung up within the last few years, and manufacturers find it increasingly necessary to be in many places fast.

These manufacturing operations have two prime markets—the rapidly-growing state with better-than-average buying power, and Latin America, swiftly emerging from a colonial to an industrial economy.

Getting about in Florida presents its problems. The distance from Miami to the northwestern border of the state is almost as great as from New York to Cincinnati. It is more than 400 miles from Tallahassee, the state capital, to Miami. Even more remote in point of access are areas of central Florida. It is impossible to get to many of the middle Florida cities by train or air line. Others require changing trains with all-day layovers for connections.

It is possible to reach all points of Florida only by automobile or lightplane. Businesses which can afford it vote for the lightplane, nine to 10, which is very comforting indeed to salesmen of aircraft.

Virtually every community in the state has an airport not too far from town, and statistics show there is a landing strip every 50 miles. Special trips that used to take two to three days are reduced to a few hours by air, and sales representatives have found it possible to get in more territory by lightplane than by auto despite the greater flexibility of the latter.

As it works out in Miami, GI flight training definitely was not an entire flop. More than one sales representative owes his job to the fact that he can fly a lightplane as well as do a job of selling. Those firms not ready to increase investments by purchasing planes find plenty of rental craft available at Sunny South.

Having the time of their lives is old stuff to sportsmen pilots in Florida. Various flying organizations sponsor air cruises through the state. They go on all sorts of odd junkets. These adventures serve to increase the problem of Sunny South. Uricho is hard-pressed to come up constantly with fresh gimmicks to titillate interest of persons long exposed to super-excitement.

How well he has succeeded is reflected at least partly in the merry clang of the Sunny South cash register. In the words of Uricho's bookkeeper, "We're doing all right." And there is every indication it will continue to do all right and even better, no matter what might happen at other private airports throughout the country.

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RECORD PLAYER, power unit mounted in front seat, with speaker aft of engine

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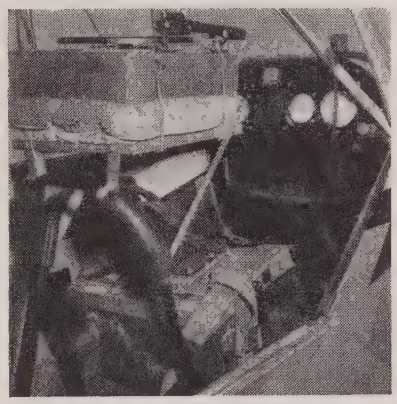

ARM on record player can't jump grooves because of motion, ship vibration

The assembly and installation of a loudspeaker in this Piper *Cub* is unique in that a record is used instead of having the pilot divide his attention between flying and reading commercial announcements. The inventor, Max Goldstein, perfected a needle arm on a record player that will not jump out of the record groove because of aircraft vibration or motion. The device operates from 12-volt battery, has 150 watt capacity. The speaker has six driver units, 25 watts each, and is most powerful ever installed in such a small plane. Audible range is over 2 miles at 1,000 feet altitude. Weight of the unit is 165 pounds. Hand microphone is available for spot announcements. The set plus installation cost just $500.

HAND MIKE is connected to the unit and can be used for periodic announcements

Air Your Views

(Continued from page 7)

Mission D-558

Gentlemen:
I should like to disagree with Gilbert Close when he states that a "terrestrial take-off speed" of 25,000 mph would be required before man could travel through space. It is true that a single impulse projectile would require such a velocity in order to be moved far enough away from the earth so that the latter's gravitational pull would be less than some other body such as the moon. A rocket, however, has a continuous impulse, and as long as its thrust is greater than the earth's gravitational force, it will continue to move away from it, no matter how small the velocity. Fuel supply, of course, is a major problem in this case. Perhaps Mr. Close had in mind a rocket taking off from the earth at zero miles per hour, and accelerating up to 25,000 mph, then coasting the remaining distance. A. E. FISHER

Thibodaux, Louisiana

Mr. Fisher, we asked Gil Close . . . and here's his reply: "Mr. Fisher is right in his discussion of rocket power and how it could be used to drive a space vehicle beyond the gravitational effects of the earth. In my article, however, I used the figure "25,000 mph" while thinking of a moon rocket which undoubtedly will be the first space projectile launched by man. It will not carry passengers and will have to attain a speed of 25,000 mph after it leaves the atmosphere and before its fuel supply is exhausted. According to engineers, this type of performance is possible with currently available rocket fuel. Howard E. Roberts, Douglas Aircraft engineer, made the following statement recently, 'A recent survey shows that flight beyond the earth's atmosphere could be achieved with presently available rocket fuels.' A little later, he states, 'The speed that is required to escape from a planet depends on the mass of the planet, i.e. its gravitational force. For example, speeds of 25,000 mph and 5,300 mph are required to escape from the earth and the moon respectively.'" Okay, Mr. Fisher?—Ed.

Aeronca Arrow

Gentlemen:
What happened to the Aeronca *Arrow*, the experimental plane that Aeronca built right after the war? BOB STIZZA

Krebs, Okla.

Report we got was that the Arrow *project was shelved.*—Ed.

Trimmer

Gentlemen:
I am an American, and a private pilot licensed in the U.S. There was a plane under construction at one time called the Commonwealth *Trimmer*. It is the one plane, I believe, that would be most ideal for private flying in Brazil. I had hoped to buy one. What I would like to know is, has any other company decided to carry on the production of that plane?
F. PAUL PETERSON

Sao Paulo, Brazil

Not that we know of. There are a couple of twin-engine planes in the offing, but they aren't amphibs. One is the Aero Commander.—Ed.

Where's Fury?

Gentlemen:
After reading different articles about the U.S. Air Navy, I was led to believe the North American *Fury* was one of its top planes. However, since it was not mentioned in your recent special section of the U.S. Navy aircraft, I'm in doubt as to the status of this plane.
J. G. KOTHROCK

Gothenburg, Nebr.

The North American Fury *is in service with the Navy, but it is no longer a production airplane. For the most part, the airplanes shown in the U.S. Air Navy special section were production or experimental aircraft; out-of-production airplanes were not featured.*—Ed.

Increase Thrust

Gentlemen:
In the Bert Parks' quiz, you state that when you're in a storm area, you should increase your power. Tch . . . tch! I always thought that when the going got rough you reduced speed. Also, what's "pilot" heat . . . Question 6?
E. CURRIE

Holyoke, Mass.

Hm . . . and our apologies, E. Currie. We wuz wrong on the power increase when entering storm area. Easy does it there. As to "pilot" heat . . . it should have read "pitot" heat . . . a typo error on the part of a funmaking type setter.—Ed.

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(*Continued on page 56*)

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INSTRUMENTS — Kollsman Sensitive Altimeters $11.45; Pioneer Turn and Banks $9.95; Rate of Climbs $6.95; Cylinder Head Temperatures $6.95; 0-300 Airspeeds $4.75; B-16 Compasses $4.95; Manifold Pressures $4.95; Suction Gauges $2.45; Headsets $1.45; Hand microphones $1.45. Payment with order. Gaare Supply Co., Box 277, Weatherford, Texas.

WIND SPEED INDICATOR—for home or airport —$49.95. Direct reading in miles per hour complete with cup anemometer, cable, and indoor dial indicator. No external power source required. Install in half hour. Send ten cents for Catalog S, Weather Bureau and amateur type instruments. Science Associates, 401 N. Broad St., Phila. 8, Pa.

COMPUTERS, War Surplus E-6B regularly priced $10.00. While they last $3.85. Directions for use including practice problems shipped free with computers. Weems Map Plotters, new, War Surplus regularly priced, $2.00. While they last $1.25. Postpaid or C.O.D. Money back guarantee. Kane Aero School, 2308 N.E. 23rd. St., Oklahoma City, Okla.

GLOBE SWIFT owners: At last we have positive gear position indicator, shows each gear exact position all time as gear moves. Non-electric, can't fail or get out of adjustment, weight 9 oz. Installed by anyone in 2 min. Guaranteed to work. $5.00 postpaid. Aircraft Equipment Co., Box 6284, Jacksonville, Florida.

E6B Computers, used, like new, plastic $5.25, metal $7.75 in leather holder. E6B Manual $2.50. E6B Computers, new, metal $9.25 plastic $8.25. Warner Computer-plotter, new $3.00. Plotter only $2.00 each. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. S, Chicago 13, Ill.

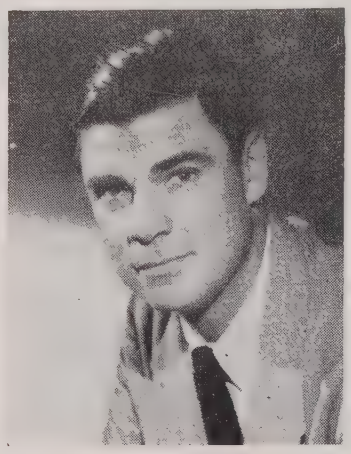
D-4 COMPUTERS 50¢ each or 3 for a Dollar. G-1 Airspeed Computers $1.00. C-2 Altitude Computers $1.00. All three computers for $2.00. Nylon Parachute Scarf now only $2.00. All cash orders postpaid. Quantity discounts! Karl Ort, Dept. B, York, Penna.

MISCELLANEOUS

YOUR Leather Jacket renovated by our craftsman, expertly, reasonably. Request Free descriptive circular. Berlew Mfg. Co., Dept. 33, Freeport, N. Y.

AIRPLANE PHOTOGRAPHS, 616 size, 5¢ each. Catalog, sample, 10¢. Henry Clark, 36 Highwood, Dumont, N. J.

Airmen's Quiz



BERT PARKS, m.c. of NBC's Wednesday evening "Break the Bank" radio and television programs, made a return visit to SKYWAYS' office to toss a "Break-the-Banker" at us. So . . . gather up a pencil and take off for a try at these questions. Score yourself 10 for each right answer. If you're in the 80 to 100 bracket, you're okay. If you miss a couple and glide into the 60 or 70 bracket, you're probably still okay but just need a little check time with the books. If you undershoot and come in under 60, watch out!

1. Cruising altitude means height above local terrain.
   ☐ Right ☐ Wrong
2. The minimum angle for crossing a civil airway during instrument flight is 45° to such airway.
   ☐ Right ☐ Wrong
3. When performing aerobatics, it's a good idea to have some ballast in any unoccupied seat.
   ☐ Right ☐ Wrong
4. As soon as your airplane gets off the ground, take your hand off the throttle and pay attention to flying the airplane.
   ☐ Right ☐ Wrong
5. When a flight instructor in the front seat pats the cowl of the airplane, he's merely being affectionate.
   ☐ Right ☐ Wrong
6. Flying a course of 75°, pilot should maintain an altitude in the odd thousands.
   ☐ Right ☐ Wrong
7. The rudder is used to turn the airplane.
   ☐ Right ☐ Wrong
8. The more speed you have, the less angle of attack you need.
   ☐ Right ☐ Wrong
9. A rotated beacon alternating white and green flashes designates a lighted land airport.
   ☐ Right ☐ Wrong
10. When a lighted intermediate field is partially or entirely unusable, double red flashing warning lights are displayed on opposite corners of the beacon tower.
    ☐ Right ☐ Wrong

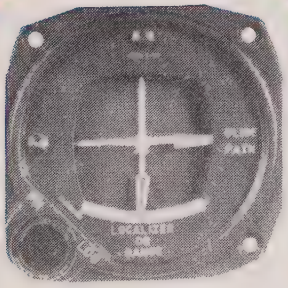
ANSWERS TO AIRMEN'S QUIZ

1. Wrong. Means height above sea level.
2. Right.
3. Wrong! Always fly as light as possible when performing aerobatics.
4. Wrong. Always keep your hand on the throttle until you've reached a safe altitude. Never let go as soon as you're off the ground.
5. Wrong. He's telling the student to get the nose down.
6. Right. From 0° to 89° inclusive, indicated altitude should be odd thousands, 3,000 feet, 5,000 feet, etc.
7. Wrong. "The airplane is turned by laying it over on its side and lifting it around through back pressure on the stick."
8. Right . . . And the less speed you have, the more angle of attack you need.
9. Right.
10. Right.

VHF communication & navigation with new *Omnigator* proves easy and reliable .....page 59

NAVICOM

NAVIGATION, COMMUNICATION



ARC's Omni-ILS Indicator

Directory of radio dealers, service stations by states—all makes...pages 62-64

Edited by Col. N. F. Silsbee

Rules of the Road in VHF Communications

A study by RTCA's SC43 on *Power Output of Airborne Transmitters* analyzes the various factors contributing to the radiated power of VHF transmitter for private aircraft. These factors are (1) the "line of sight" characteristics which automatically include altitude and distance between the communicating points; (2) the effectiveness of antennas, both airborne and ground, including lobing and directivity; and (3) comparative freedom from atmospheric disturbances (static).

The committee's conclusion was that *installed power* is only a minor factor in successful VHF communication. The attention of private pilots is invited to these other more controlling factors:

1. **Party Line** ▶ Remember that the air-ground-air radio channels are "party lines" and are not for anyone's exclusive use. Extend the same courtesy to the other fellow that you expect him to extend to you. Remember that a low-powered transmitter at close range can quite effectively "jam" communication of a much higher power transmitter at a greater range and that a high-power transmitter aboard your aircraft does not guarantee good communication.

2. **Line of Sight** ▶ Do not attempt communication with a ground station unless you are within line of sight. This means at least 1,000 feet of altitude to communicate with a station 39 miles distance, 3,000 feet to 67 miles, and 10,000 feet to 122 miles.

3. **Too High, too Near** ▶ Remember that your communication range increases with altitude, and attempts to communicate with a ground station in the immediate vicinity from an altitude of 3,000 feet may cause interference to communication of other stations as much as 70 miles away.

4. **Slight Increase** ▶ Don't be misled by "power." Remember that a change in power from 1 to 20 watts only gives a change in *relative signal* of about 4.5 to 1. Since this difference is far less than other variables which affect your VHF communication, the advantage of the apparent increase is exceedingly minor and may not be worth the resultant increase in weight, space and cost, not only of the transmitter itself but of the requirement for primary power in the aircraft. A survey of VHF transmitters licensed by the FCC to private and executive pilots showed only about 25 per cent of them with an output of over 5 watts. Here are the figures on some of the more widely used lightweight VHF transmitters: A.R.C. T-11A, 2 watts; Lear RT-10C, 2 watts; NARCO VTA-2, 3 watts; RCA 116, 1.25 watts. Bendix and Collins sets are heavier.

NAVICOM

Navigation with NARCO

New and improved *Omnigator* shows its stuff at high and low altitudes, from far and near

By Col. N. F. Silsbee

Shortly after the break up of a mid-summer meeting in Washington, NARCO's Jim Riddle told me of a new model of their VHF integrated communication-navigation system, Model VTR-1 *Omnigator*.

A couple of weeks later Jim flew up from Wings Field to Teterboro in the *Bonanza* which was equipped with the new set, for a demonstration flight. The plan was to head for the fairly distant Baltimore omnirange station, make a simulated ILS approach on Friendship Intern'l Airport, "omnigate" over Philadelphia Southwest to Wings for a quick lunch and look at the plant, and then back to Teterboro.

It was a fine, clear summer day and it sounded like a good deal. It was—and I really learned a lot, not only about the new NARCO *Omnigator* but about the simplicity and reliability of VHF communication *and* navigation.

We took off at 9:55 (EST) from the NE/SW runway 6-24 which started us off on a heading of 240°. We climbed to 3,000 feet, and I began looking around the cockpit.

In this demonstration ship the new VTR-1 *Omnigator* was in front of me in the right hand glove compartment, occupying a panel space of 5½ inches by 6⅞ inches. In the standard installation it will be on the left, a spot now occupied by the Motorola VHF transmitter and LF receiver unit. Below this was the original NARCO VHF Radio transmitter-receiver-omni set, which was several inches wider than the *Omnigator* and which required an omni conversion box below the panel and the Left-Right needle in a separate dial.

Here's what I saw on the *Omnigator* panel: A tuning crank for VOR omni stations, VAR (VHF 2-course Visual-Aural Ranges and ILS localizers, covering 108 to 126.5 mcs. The old set stopped at 122 mcs, but the 126.5 was added to include military range stations for emergency use); volume control knob; and a five-position function switch for 1) Power off, 2) Communication, which shuts down navigation circuits to conserve battery drain and eliminate receiver blocking when close to control towers; 3) Omni, provides communication plus omni navigation; 4) Phase localizer, provides communication plus phase localizer approach; 5) VAR, provides communications and visual-aural range navigation or tone localizer approach.

The other three controls on the panel were the 75-mc Marker Beacon switch (not on the earlier NARCO set), Transmitter Frequency Selector, and Course Selector.

The Marker Beacon switch is a pull-on type and operates in any function switch position at any volume control setting giving an overriding aural marker signal in headphones or loud speaker.

The Transmitter positions include interphone plus eight frequencies from 121.5 to 122.9 mcs. 122.1 (airway communication centers) and 122.5 (airport control towers) are supplied as standard; others at extra cost, including the newly authorized 122.8-mc private flyer's *unicom* frequency for air-to-air and air-to-small airport communication.

The Course Selector, instead of the large black knob on the original set, is a horizontal thumb wheel similar in appearance to a gyro compass card, calibrated from 0 to 360°.

Three indicators are built into the front panel—the receiver dial (108 to 126.5 mcs); a two-inch Left-Right meter (referred to as the "needle") for all navigation and approach functions; and the To-From meter for a standard omni operation. There is also a transmitter output indicator lamp.

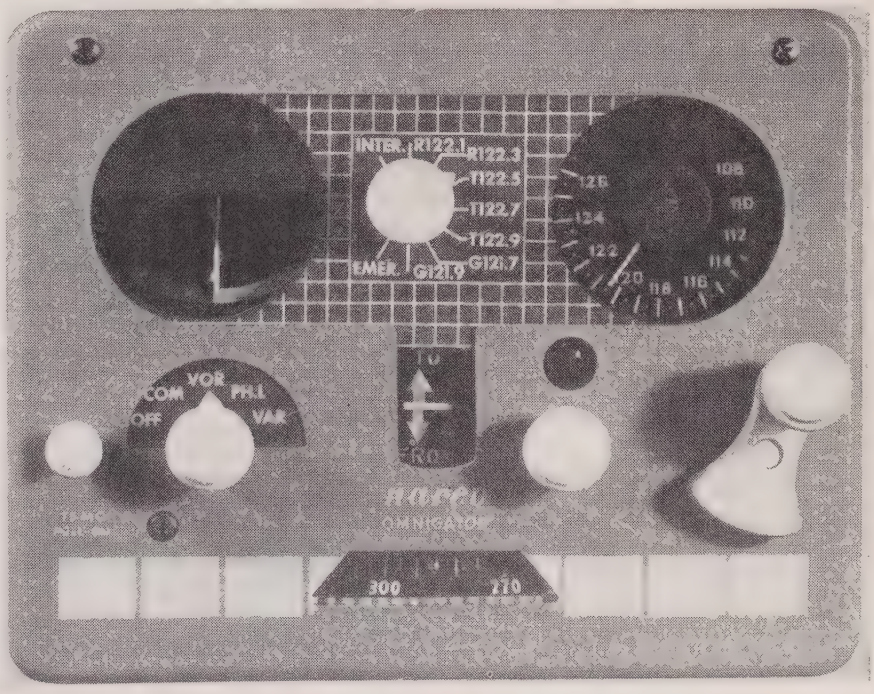
To have this explained to me took a lot less time than to write it. By now we were up to about 6,000 feet and over Newark. Tuning in to Philadelphia International tower, Jim inquired if the ILS localizer was functioning. (They said it was). He then asked, "How do you hear me?"

The reply came over the speaker (we weren't using earphones), "We hear you 5x5." This is top rating for loudness and clearness: distance was 90 miles.

Climbing to about 9,000 feet we leveled off over the New Brunswick area. We had to go high to get a station as far away as Baltimore. The nearer Allentown omni was getting its new plastic dome. Our heading was still our original 240° and we were expecting to pick up Baltimore omni any minute. Shortly afterwards, at about 9300 feet we began to hear the 'beep-beep' of its identification signal, which a few seconds later became unmistakably clear. This would be at least 120 miles away.

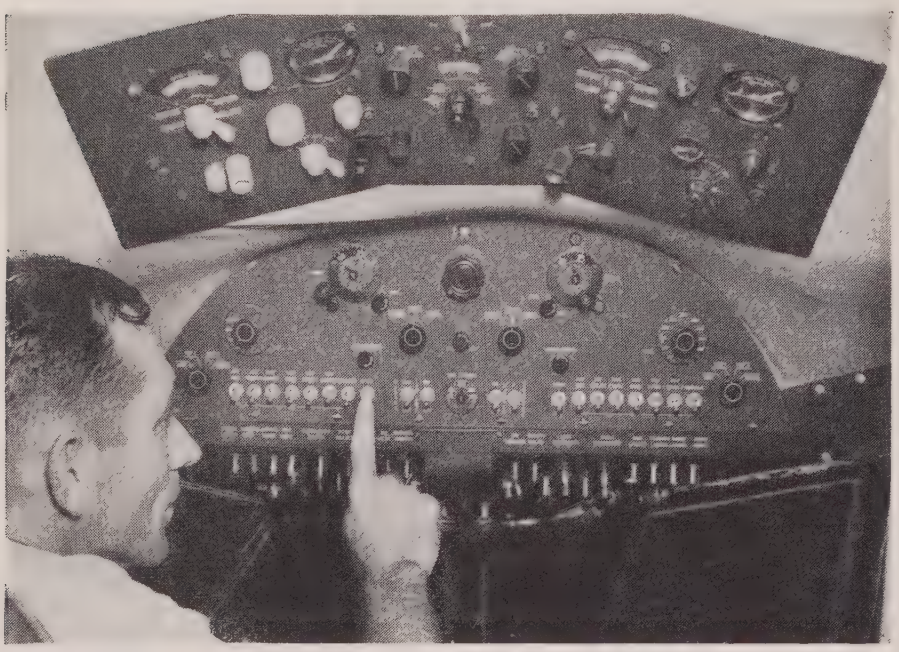
(Continued on page 64)

COMPACT *Omnigator* panel controls all VHF communication and navigation functions



Radio for Lucerne's Lodestar

Southwest Airmotive Company Provides Tailor-Made Job



CONTROL panels in Lucerne Corporation's executive Lockheed *Lodestar* illustrate Southwest Airmotive Company's "planned radio" installations for corporation executive planes.

What it takes to provide a multi-engine executive aircraft with up-to-date radio communication and navigational facilities can be seen in Southwest Airmotive Company's tailor-made job on Lucerne Corporation's Lockheed *Lodestar*.

Some of the sets were placed in the forward section of the nose baggage compartment, neatly covered by a vented curtain (*see photo*). These include (top shelf) AM-26 amplifier (weighs 5 pounds); Bendix RA-10DA range receiver (32); and the ARC type F-11 Isolation Amplifier (8) which permits radio functions to be divided between pilot and co-pilot without cross-cockpit interference. Middle shelf: Bendix R5/ARN-7 dual ADF (65 pounds each). Bottom: Bendix MN-53A marker beacon (18), two Holtzer-Cabot inverters (30 each), and Type JX 23 filter.

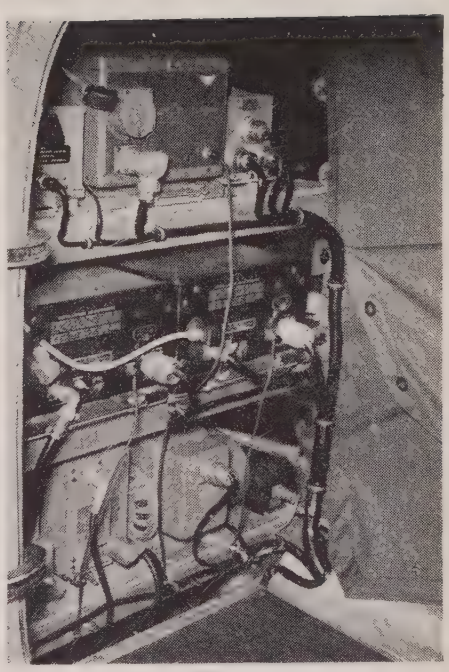
Sets Hidden ▶ Some more of the radio gear was placed in the aft portion of the nose baggage compartment and concealed by a Dzus-fastened metal cover (*photo shows gear uncovered*). The sets include: Colonial Radio Corporation R77/ARC-3 Schuttig modified 24 channel VHF receiver (20.5 pounds), power supply (19) main junction box, and ARC type T-11A VHF transmitter (3.4); (below), ARC type R-15 VHF receiver (8.3), R77/ARC-3 24-channel VHF transmitter, and war surplus R89B/ARN-5 glide slope unit (13.5).

The balance of the complex installation (not shown in photos) consists of the ARC type 15B Omni-ILS receiver in the #2 baggage compartment, and the ART-13 Collins 100-watt MHF transmitter in the tail section.

The total weight is about 485 pounds, and every conceivable navigational and communications function has been provided for, with "backing" for the VHF equipment in LF and MHF.

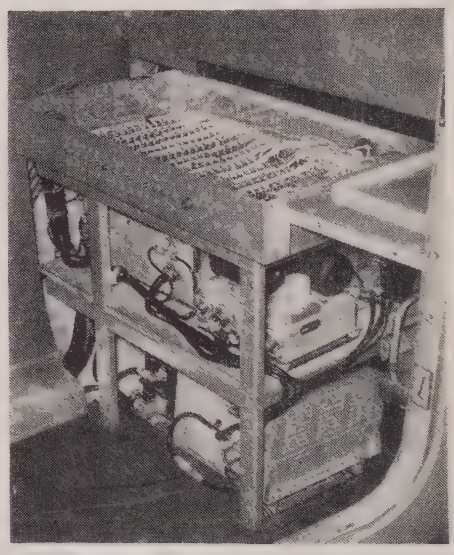
Special Panel ▶ The main control panels for all this equipment are not nearly as complicated as might be expected (*see photo*). Notice the dual audio switching system for F-11 isolation amplifier (technician is pointing to pilot's control, co-pilot's at right). At top center of lower panel is the SAC-designed VHF transmitter-receiver switch which gives a visual and direct frequency reading for the ARC-3 system (VHF 1). At its right is the switch for the VHF 2 system—the ARC T-11A transmitter and R-15 receiver. Both of these VHF systems are for communications only, leaving the ARC type 15B Omni-ILS (tuning switch at left center) for navigation. Both panels are the plug-in type for easy maintenance.

This is a recent example of the special radio installations for executive aircraft by SAC's radio shop (October *Skyways, Navicom* section, page 60).



VENTED curtain *(right)* is snapped on, and this important radio gear is out of sight

METAL covers are fastened over top and sides, concealing and protecting radios, wiring



New-Type MTI

According to Donald K. Allison, who was on the staff of Radiation Laboratory at MIT, the electronic method of providing moving-target-indication (MTI) is highly complicated. Its job is to eliminate radar returns from fixed ground targets and reduce cloud returns, both of which clutter up radar scopes and obscure aircraft signals.

Allison has privately demonstrated a simpler and far less costly technique (non-electronic) which would be useful in new ground radar equipment for the transition program. It could also add the valuable MTI feature to war surplus sets for Western Europe radar net.

Lightweight Autopilot at Last

Lear's L-2 provides relief in long X-country flights

The Lear L-2 automatic pilot for personal and executive aircraft has been flight demonstrated and is now available. Its main function is to extend the utility and safety of personal and executive aircraft through reducing pilot fatigue during long cross-country flights, and it makes instrument flying in personal aircraft more practical. It does for these planes what the Sperry gyropilot has been doing for Air Force and Navy bombers and transports and for commercial airliners for some years.

Light Weight ▶ The L-2 is the first autopilot small and light enough to be installed in personal and executive type aircraft. It weighs only 36.15 pounds complete and is no bigger than a loaf of bread.

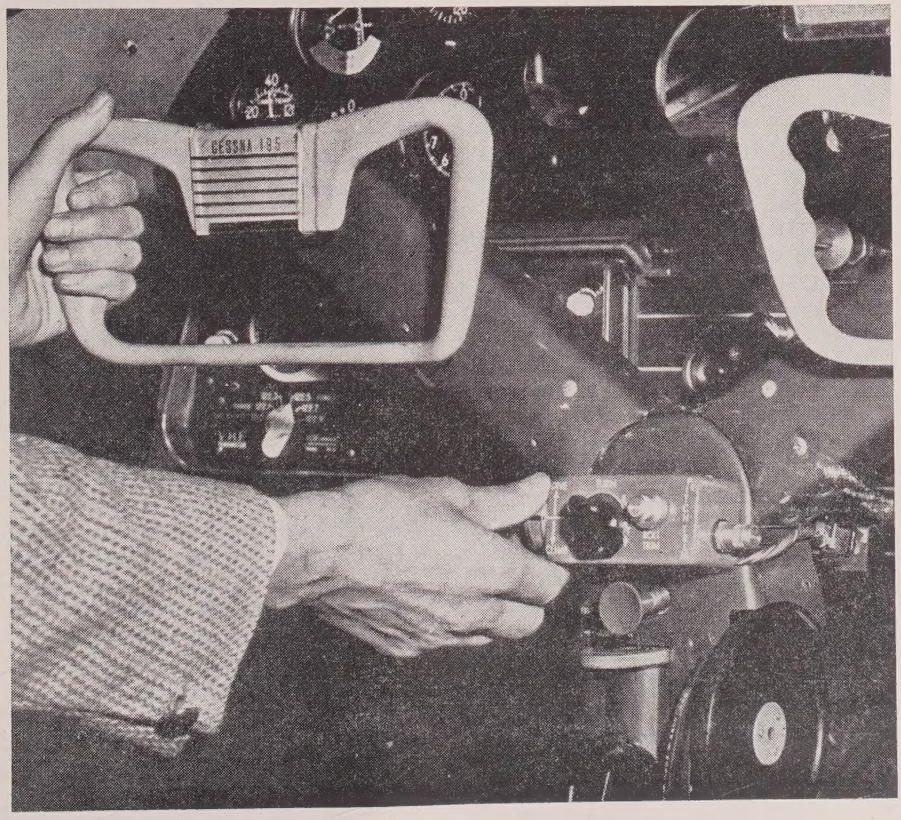
Inside the black box which houses the amplifier unit is a myriad of electrical curcuits. An instrument on the panel called a gyroscope, when set, senses any changes in the plane's attitude and causes an electrical impulse to be sent to a small electro-mechanical device called a "servo." The servo which has three output drives, one connected to each of three sets of the plane's control surfaces, deflects the surfaces just enough to put the plane back on the course. This only takes a split second and as a result the plane stays in perfect level flight.

In addition to this, however, the L-2 is a maneuvering pilot, making possible coordinated turns, climbs and dives.

Relieves Pilot ▶ As Bill Lear puts it, "The thing that is holding back aviation for the business men pilots is the need for that constant two ounces of pressure on the wheel. In cross-country flight, no matter how much stability is built into a plane, it will require trimming as the pilot shifts his weight or as it encounters air currents. What we need is an automatic pilot to hold the airplane straight and level and take the cross-country labor off the pilot so he will arrive fresh enough for a business conference."

Sales of the L-2 Lear Autopilot are handled by the Aircraft Radio Division, Lear, Incorporated, Grand Rapids, Mich. Price is $2,990, plus installation charges, with 60-day delivery. Arthur Godfrey has one in his DC-3 (after putting in many hours with it in Bill Lear's Twin Beech) and is very happy over its performance.

LEAR'S Personal Automatic Pilot (L-2) installed in Cessna 195. Pilot's hand is on control



NAVICOM'S Radio Dealers & Service

(Compiled from Manufacturers' Authorized Lists)

Key: A—A.R.C. C—Collins M—Mitchell R—RCA
B—Bendix L—Lear N—NARCO

Alabama

AERO SERVICE & SUPPLY (A, L)
Municipal Airport, Birmingham, Ala.
CHAPMAN ELECTRIC CO. (B)
Municipal Airport, Mobile, Ala.

Arizona

ARIZONA AIRMOTIVE, INC. (N)
2410 E. Airline Way, Phoenix, Ariz.
CULVER'S (R)
231 No. First Ave., Phoenix, Ariz.
SKY HARBOR AIR SERVICE (L)
Sky Harbor Airport, Phoenix, Ariz.
AIRBORNE, INC. (B)
1500 East 36th St., Tucson, Ariz.

Arkansas

McRADIO REPAIR SERVICE (B, N)
Municipal Airport, Little Rock, Ark.

California

PEMBERTON FLYING SERVICE (L)
Municipal Airport, Bakersfield, Calif.
LOCKHEED AIRC. SERV. INC. (C)
Lockheed Air Terminal, Burbank, Calif.
PACIFIC AIRMOTIVE CORP. (B)
Lockheed Air Terminal, Burbank, Calif.
QUALITRON, INC. (A, B, L, N)
Lockheed Air Terminal, Burbank, Calif.
RADIO DOCTOR (B)
Ranchaero Airport, Chico, Calif.
THE AIR OASIS COMPANY (B)
Chandler Field, Fresno, Calif.
GRAND CENT'L AIRCR. CO. (B)
Grand Central Airport, Glendale, Calif.
SANTA BARBARA FLYING SERVICE (N)
Santa Barbara Airport, Goleta, Calif.
BAYAIR RADIO SERVICE (B)
Municipal Airport, Hayward, Calif.
SKYCRAFTERS AV. RADIO (B, L)
2735 E. Spring St., Long Beach, Calif.
AIR RADIO ELECTRONIC LAB. (B)
5907 W. Imperial Highway, Los Angeles
WINSBY FLEMING (B)
Hayward Munic. Airport, Oakland, Cal.
PACIFIC AIRCRAFT SALES CO. (N)
Oakland Airport, Oakland, Calif.
PACIFIC AIRMOTIVE CORP. (R, B)
Oakland Airport, Oakland, Calif.
PALO ALTO AIRPORT, INC. (B)
Palo Alto Airport, Palo Alto, Calif.
VALLEY AIR SERVICE (L)
Box 909, Rialto, Calif.
C. J. HENDRY COMPANY (L)
27 Main St., San Francisco, Calif.
MARTIN SCHOOL OF AVIA. (B)
Orange County Airport, Santa Ana, Cal.
CLOVER FIELD RADIO SERVICE (B, N)
Municipal Airport, Santa Monica
SANTA MONICA AVIATION (L)
Santa Monica Airport, Santa Monica
KERN COUNTY RADIO CO. (B)
Taft-Kern Co. Airport, Taft, Calif.

Colorado

AERO ENTERPRISES, INC. (B)
Sky Ranch Airport, Denver, Col.
AIRCRAFT RADIO & ACCESSORY CO. (A, L)
Stapleton Airfield, Denver, Col.
CLINTON AVIATION CO. (N)
Stapleton Field, Denver, Col.

Connecticut

AVIATION SERVICE, INC. (B)
Brainard Field, Hartford, Conn.
PRATT & WHITNEY AIRCRAFT DIV. (A, C)
400 S. Main St., E. Hartford, Conn.
USHER AVIATION (L, N)
Municipal Airport, New Haven, Conn.
AERO MARINE RADIO LAB. (B)
Stonington Airport, Stonington, Conn.

Delaware

ATLANTIC AVIATION SERVICE (B, L, N)
New Castle Co. Airport, Wilmington

Florida

AERODEX, INC. (A)
Miami International Airport, Miami
AIRCRAFT SERVICE CORP. (N)
Miami International Airport, Miami
AIR-MARINE RADIO SERVICE (B)
International Airport, Miami
WALLACE AIRCRAFT CO. (R, N)
Sarasota-Bradenton Airport, Sarasota
SAM LONG—RADIO AIR MARINE (B, N)
Albert Whitted Airport, St. Petersburg
E. FARNELL & COMPANY (N)
Palm Beach Int'l Airport, W. Palm B'ch

Georgia

SAXON AIRCRAFT RADIO CORP. (A, N)
Municipal Airport, Atlanta, Ga.
SOUTHEASTERN AIR SERVICE (L)
Municipal Airport, Atlanta, Ga.
SOUTHERN AIRWAYS CO. (B)
Municipal Airport, Atlanta, Ga.

Idaho

AIRCRAFT SERVICE CO. (L)
Bradley Field, Boise, Idaho

Illinois

TAYNOR-HARRIS AVIATION SERVICE (N)
Champaign Airport, Champaign, Ill.
BUTLER COMPANY, AVIATION DIV. (A, B, C, L)
Municipal Airport, Chicago, Ill.
SNYDER AIRCRAFT DIV.—AIR ASSOCIATES (R, N)
5315 W. 63d St., Chicago 38, Ill.
AIRWAY RADIO SALES & SERVICE (B)
Harlem Airport, Chicago (Oak Lawn)
SKYMOTIVE SALES, INC. (A, N)
P. O. Box 505, Chicago (Park Ridge)
SKYMOTIVE AVIATION MANAGEMENT CORP. (B)
Chicago-Orchard Airport, Park Ridge
PARKS AIRCRAFT SALES & SERVICE (B)
Palwaukee Airport, Chicago (Wheeling)
AIRCRAFT RADIO LAB. (M, N)
Sky Harbor Airport, Chicago (Northbrook)
MID STATES AVIATION CORP. (L)
Sky Harbor Airport, Chicago (Northbrook)
HAROLD HAYS, President (N)
Illini Airport, Urbana, Ill.

Indiana

CONSOLIDATED AIRCRAFT REPAIR, INC. (B, N)
Smith Municipal Airport, Ft. Wayne
ROSCOE TURNER AERONAUTICAL CORP. (A, B, L, N)
Weir Cook Munic. Airport, Indianapolis
MUNCIE AVIATION CORPORATION (L, N)
Muncie Airport, Muncie, Ind.
STOCKERT FLYING SERVICE (N)
Bendix Field, South Bend, Ind.

Iowa

HUNTER FLYING SERVICE (L, N)
Hunter Field, Cedar Rapids, Iowa

Kansas

DICKERHOOF FLYING SERV. (L)
Municipal Airport, Chanute, Kansas
AERO INSTRUMENT REPAIR & SERVICE (M)
Municipal Airport, Wichita, Kansas
HARTE FLYING SERVICE (L, N)
Municipal Airport, Wichita, Kansas
STANDARD PRODUCTS, INC. (B)
650 East Gilbert St., Wichita, Kansas
YINGLING AIRCRAFT, INC. (L, N)
Municipal Airport, Wichita, Kansas

Kentucky

AIRCRAFT RADIO LAB. (N)
Bowman Field, Louisville 5, Kentucky
KENTUCKY AIR TRANSPORT, INC. (R, B)
Bowman Field, Louisville, Kentucky
KENTUCKY INSTITUTE OF AERONAUTICS (L)
Paducah-McCracken Airport, Paducah

Louisiana

AIRCRAFT RADIO SUPPLY CO. (B, N)
New Orleans Airport, New Orleans, La.
LOUISIANA AIRCRAFT (L)
1202 Main St., Baton Rouge, La.
SAXON AIRCRAFT RADIO (N)
Municipal Airport, Shreveport, La.

Maryland

ATLANTIC AIRCRAFT DISTRIBUTORS (L)
Municipal Airport, Baltimore, Md.
SANDERS AVIATION, INC. (B)
ERCO Field, Riverdale (Wash., D.C.)

Directory

Massachusetts

ATLANTIC AVIATION CORPORATION (B, L, N)
Boston-Bedford Airport, Bedford, Mass.
EAST COAST AVIATION CORP. (B)
Hanover Airport, Hanover, Mass.
VAN DUSEN AIRCRAFT SUPPLIES (R)
50 North Main St., North Grafton
E. W. WIGGINS AIRWAYS (B)
Norwood Airport, Norwood, Mass.
AERONAUTICAL RADIO SERVICE (B)
Barnes Municipal Airport, Westfield

Michigan

ANDERSON AIRCRAFT RADIO CO. (B, A)
Detroit City Airport, Detroit, Mich.
NAN-BAR AIR FACILITIES (M)
Wayne County Airport, Detroit, Mich.
SERVAIR, INC. (R)
Detroit City Airport, Detroit, Mich.
NORTHERN AIR SERVICE (B, L)
Grand Rapids Airport, Grand Rapids
FRANCES SCHOOL OF AVIATION (L, N)
Capitol City Airport, Lansing, Mich.
GREAT LAKES AIRMOTIVE (B)
Willow Run Airport, Ypsilanti, Mich.

Minnesota

VAN DUSEN AIRCRAFT SUPPLIES (R, L, N)
2004 Lyndale Ave., So., Minneapolis
GOPHER AVIATION, INC. (A, B, L, N)
Rochester Airport, Rochester, Minn.
VANS AIR SERVICE (B, L, M)
Municipal Airport, St. Cloud, Minn.
NORTHWESTERN AERONAUTICAL CO. (B)
Holman Field, St. Paul, Minn.

Mississippi

SOUTHERN AIR SERVICES (B)
Sanders Field, Glover, Miss.
AIRCRAFT COMMUNICATIONS CO. (N)
Municipal Airport, Jackson, Miss.

Missouri

AIRCRAFT RADIO CO. (B, L)
Municipal Airport, Kansas City
PACIFIC AIRMOTIVE CORP. (R)
1628 McGee St., Kansas City 8, Mo.
INTERSTATE AIRMOTIVE (N)
Lambert Airport, Robertson, Mo.
NAVCO, INC. (C)
Lambert Field, St. Louis, Mo.
FABICK AIRCRAFT CO. (L)
Lambert Field, St. Louis, Mo.
REMMERT-WERNER, INC. (A, L)
Lambert Field, St. Louis 21, Mo.

Nebraska

PRAIRIE AIRWAYS, INC. (L)
Municipal Airport, Lincoln, Neb.
AERO SERVICE, INC. (N)
Municipal Airport, Omaha, Neb.

New Jersey

SOMERSET AIR SERVICE, INC. (B)
Somerset Airport, Bedminster, N.J.
ECHELON AERO SERVICE (N)
Box 104, Haddonfield, N.J.
H. F. BEANE (B, N)
Newark Airport, Newark, N.J.
THE BABB COMPANY (A, R)
Hangar 8, Newark Airport, Newark
RED BANK AIRPORT, INC. (M)
Red Bank, New Jersey
ATLANTIC AVIATION CORP. (A, B, L, N)
Teterboro Air Terminal, Teterboro
MALLARD AIR SERVICE INC. (L)
Teterboro Air Terminal, Teterboro
ODOM AVIATION CORP. (L)
Teterboro Air Terminal, Teterboro
SAFAIR FLYING SERVICE (N)
Teterboro Air Terminal, Teterboro
VAN DUSEN AIRCRAFT SUPPLIES (R, N)
Teterboro Air Terminal, Teterboro

New Mexico

CUTTER-CARR FLYING SERVICE (B, L)
P. O. Box 274, Albuquerque, N.Mex.

New York

LINK AERONAUTICAL CORP. (B)
Tri Cities Airport, Binghamton, N.Y.
BUFFALO AERONAUTICAL CORP. (A, B, R, L, N)
Buffalo Airport, Buffalo, N.Y.
LONG ISLAND RADIO CO. (B)
Flushing Airport, Flushing, L.I., N.Y.
AIRMAR RADIO SERVICE, INC. (B)
MacArthur Airport, Islip (Bohemia)
AERONAUTICAL RADIO MFG. CO. (B, R, L)
155 First St., Mineola, L.I., N.Y.
SMITH-MEEKER ENGINEERING CO. (B, C)
125 Barclay St., New York City
PAGE AIRWAYS, INC. (B, C, L, N)
Municipal Airport, Rochester, N.Y.

North Carolina

CAROLINA AERONAUTICS, INC. (L, M)
Box 1021, Hendersonville, N.C.
AERONAUTICAL ELECTRONICS INC. (B, C, L, N)
Raleigh-Durham Airport, Raleigh, N.C.
PIEDMONT AVIATION, INC. (R)
Smith Reynolds Airport, Winston-Salem

Ohio

CHAMBERLAIN AVIATION (B)
Municipal Airport, Akron, Ohio
AIRBORNE COMMUNICATIONS (N)
Lunken Airport, Cincinnati 26, Ohio
QUEEN CITY FLYING SERVICE (L)
Hangar 3, Lunken Airport, Cincinnati
FLIGHT, INC. (R, L)
Municipal Airport, Cleveland, Ohio
RICHLAND AVIATION, INC. (N)
Municipal Airport, Cleveland, Ohio
SKY TRAVEL, INC. (B)
Municipal Airport, Cleveland, Ohio
SNYDER AIRCRAFT CORP. (R)
Sullivant Ave. Airport, Columbus, Ohio
STATE AVIATION CORP. (B)
Port Columbus, Columbus, Ohio
DAYTON AIRADIO, INC. (A, L, N)
Dayton Municipal Airport, Vandalia, O.
OHIO AVIATION COMPANY. (B, N)
Dayton Municipal Airport, Vandalia, O.
SOUTHERN OHIO AVIATION (L)
Dayton Municipal Airport, Vandalia, O.
METCALF FLYING SERVICE (L)
Toledo Municipal Airport, Walbridge
YOUNGSTOWN AIRWAYS, INC. (L)
Municipal Airport, Youngstown, O.

Oklahoma

AIRCRAFTSMEN, INC. (L)
Municipal Airport, Oklahoma City
DOWNTOWN AIRPARK FLYING SERVICE (N)
Box 894, Oklahoma City, Okla.
SPARTAN AERO REPAIR—RADIO DIV. (B, N)
Municipal Airport, Tulsa, Oklahoma
GEORGE WALLER (C)
6540 E. Washington Blvd., Tulsa, Okla.
WILSON RADIO CO. (B, L, N)
Municipal Airport, Tulsa, Okla.

Oregon

FLIGHTCRAFT, INC. (L, N)
Columbia Airport, Portland
PORTLAND AIRCRAFT RADIO SERVICE (B)
Portland-Columbia Airport, Portland
WESTERN SKYWAYS SERV. (B, M)
Troutdale Airport, Portland, Oregon
A. W. WHITAKER (R, L)
5001 N.E. Union Ave., Portland, Ore.

Pennsylvania

NARCO FACTORY SERVICE (N)
Wings Field, Ambler, Penna.
HARRISBURG AVIATION ELECTRONIC SERV. (B, N)
State Airport, Harrisburg, Penna.
AERONAUTICAL INDUSTRIES (L)
Hangar 2, International Airport, Phila.
AERIAL SURVEYS OF PITTSBURGH (L)
622 Olympia Road, Pittsburgh, Penna.
RUSSELL P. HAY, INC. (A, L, N)
Allegheny County Airport, Pittsburgh
AVIATION CONSULTANTS (A, L, N)
Municipal Airport, Reading, Penna.
READING AVIATION SERVICE (B)
Municipal Airport, Reading, Penna.

Rhode Island

ALLEN AIRWAYS (B)
State Airport, Hillsgrove, R.I.

South Carolina

HAWTHORNE FLYING SERV. (B)
Municipal Airport, Charleston, S.C.

Tennessee

SHOBE, INC. (M)
1117 Union Ave., Memphis, Tenn.

Texas

KENYON AIRC. RADIO CO. (N)
Cuddihy Field, Corpus Christi, Texas
ASSOCIATED RADIO CO. (B, L)
Love Field, Dallas, Texas
DALLAS AERO SERVICE (B)
Love Field, Dallas Texas
MUSTANG AVIATION (L)
Box 9192, Love Field, Dallas, Texas
SOUTHWEST AIRMOTIVE CORP. (A, B, R,)
Love Field, Dallas, Texas

(Continued on page 64)

Radio Directory

(Concluded)

GENERAL AERONAUTICS (L)
Meadham Field, Fort Worth, Texas
DAVE RUMPH COMPANY (B, M)
Meacham Field, Fort Worth, Texas
WILSON RADIO COMPANY (B, N)
Meacham Field, Fort Worth, Texas
CLIFF HYDE FLYING SERV. (L)
Sam Houston Airport, Houston, Texas
GRAY ELECTRONICS, INC. (B, N)
Municipal Airport, Houston, Texas
J. D. REED COMPANY (B, L, N)
Municipal Airport, Houston, Texas
TRANS-TEXAS AIRWAYS (N)
Municipal Airport, Houston, Texas
WILSON RADIO COMPANY (N)
Municipal Airport, Houston, Texas
SAXON AIRC RADIO (A, B, C, N)
Gregg County Airport, Longview, Texas
WEST TEXAS FLYING SERV. (N)
Box 801, Midland, Texas
SAXON AIRC RADIO CO. (B, N)
Stinson Field, San Antonio, Texas
TAYLOR RADIO COMPANY (N)
Pounds Field, Tyler, Texas
HOFFMAN RADIO SERVICE (B)
Municipal Airport, Uvalde, Texas

Utah

WEST AMERICAN AIRWAYS (B)
Municipal Airport, Ogden, Utah
THOMPSON FLY'G SERV. (R, N)
Municipal Airport, Salt Lake City, Utah

Virginia

ASHBURN FLYING SERVICE (B)
Alexandria Airport, Alexandria, Va.
LYNCHBURG AIR TRANSP. & SALES CORP. (L)
Preston Glenn Airport, Lynchburg, Va.
CENTRAL RADIO COMPANY (B)
3207-9 Granby St., Norfolk, Va.
AIRCRAFT RADIO SERVICE (B, L, M, N)
Byrd Airport, Richmond, Va.
RADIOCRAFTERS COMPANY (B)
105 Broad Street, South Boston, Va.

Washington

AIRCRAFT SALES & SERVICE, INC. (B)
Boeing Field, Seattle, Wash.
ANGLE RADIO COMPANY (L)
209 First Ave. South, Seattle, Wash.
WASHINGTON AIRCRAFT & TRANSP. CORP. (L)
Boeing Field, Seattle, Wash.

West Virginia

PIONEER FLYING SERV., INC. (N)
Municipal Airport, Morgantown, W. Va.

Wisconsin

ANDERSON AIR ACTIVITIES (B)
Truax Field, Madison, Wisconsin
MOREY AIRPLANE COMPANY (L)
Middleton, Wisconsin
ANDERSON AIR ACTIVITIES (B, N)
General Mitchell Field, Milwaukee, Wis.
FLITEWAYS, INC. (L)
4101 W. Greenfield Ave., Milwaukee
WILLIAMS AIRCRAFT RADIO SERVICE (N)
General Mitchell Field, Milwaukee, Wis.

NAVIGATION with NARCO

(Continued from page 59)

The To-From needle was in the red margin toward "To" at first but soon went all the way up into the clear. Slowly working the Course Selector wheel with his thumb, Jim got the Left-Right needle to dead center at 240°. (If we had been following a slightly different heading, we simply would have had to bring the nose around to 240° on the magnetic compass above the main panel; as it was we just kept on our 240° course.)

I noticed that the L-R needle was unusually steady· I was to get a demonstration a bit later as to its accuracy and sensitivity.

We gradually descended to 4,000 feet, and quickly passing over Trenton Airport, with Mercer Airport on our right, we soon spotted Navy's fields at Willow Grove and Johnsville. Turning on the Baltimore omni voice signal, we picked up the 10:45 half-hourly broadcast of weather conditions, etc., at major fields all down the east coast.

A few minutes later, as a cross check as to our whereabouts (assuming bad weather) we tuned in to Harrisburg omni and got a track of 99° *from* that station. Using the compass rose around Harrisburg shown on the chart, Jim drew a pencil line from the center out through 99° until it crossed the line he had drawn from Teterboro to Baltimore. It intersected the line at the northern tip of Chesapeake Bay, known as Northeast River, and sure enough, we looked down and that is exactly where we were. Harrisburg VOR was about 60 miles away; we were flying at 3,000 feet.

Continuing our 240° heading we passed over the Glenn L. Martin plant at Middle River, and not long after that we flew over Baltimore omni, which we could see off in a field. Even if we had not been able to see it the *Omnigator* would have quite excitedly and unmistakably let us know. The To-From meter quivered a bit, then rapidly fluctuated and finally went down clearly into the "From" section.

Switching to VAR, we then proceeded to pick up Friendship localizer, and when we intersected we turned west until we hit the outer marker. With the little Marker Beacon knob pulled out, it was not long before we heard a strong clear signal which told us we were just 4.4 miles from Friendship runway.

Making the procedure turn, we again caught the MB signal and began our run in on the localizer, keeping the Left-Right needle centered. Our altitude was about 800 feet, speed reduced to 110. A couple of minutes later, we picked up the middle marker, one-half mile from runway. Watching the sensitive altimeter (which indicates descent by 20-foot gradations) and keeping the L-R needle centered, we "broke through" at about 300 feet, indicating about 100 mph. A very short turn to the right and then to left showed up instantly on the needle, indicating its accuracy and sensitivity for ILS approaches.

Instead of flying over Friendship, we turned off at the beginning of the runway and headed back to Baltimore omni. We picked up our track of 60° *from* Baltimore VOR and headed for Wings.

I said to Jim, "How about VHF at *low* level? I've heard a lot of criticism about that."

"OK, let's try something. We'll cross the Susquehanna near the Conowingo Dam, fly real low over the trees and see how we pick up Baltimore omni."

A few minutes later and that's just what we were doing. We turned the volume up and the Baltimore signal kept coming through clear as a bell. It was about 40 miles away. I glanced at the altimeter as we went down on the deck and it said 300 feet, then 250, then 200, but I'll swear we felt the swish of the branches of some of the taller trees as we skimmed along. The 'beep-beep' signal stayed right with us all the way.

"I guess it depends on whose omni you are flying," said Jim with a grin.

We flew on over Philadelphia International and soon were enjoying a steak sandwich at the Philadelphia Aviation Country Club at Wings Field, joined by "Rudy" Garfield, NARCO Production & Procurement vice-president.

Rudy told me that nearly 1600 of the original NARCO sets had been sold—as many as all other makes put together. CAA had given a grant of $20,000 for the development, on the express condition that a lightweight, *low-priced* set be turned out, and yet one that would honestly do the job required.

Back in the office, Rudy Garfield pulled out of the files an unsolicited letter from Orv Armstrong, chief pilot of CAOA member Modern Welding Co. of Owensboro, Kentucky. It was a most enthusiastic "plug" for the NARCO equipment in their Twin Beech and Cessna 195. It ended by saying, "We will be only too glad to answer any questions regarding the operation of this equipment at any time. Thank you for putting such a wonderful unit on the market!"

We stepped over to the shop, and chief engineer A. R. Applegarth gave me a quick demonstration of the sound design and sturdy construction of the new *Omnigator* set, and also its easy maintainability.

They also told me that having proved the market on the original NARCO omni, they have done a fairly elaborate tooling job for the *Omnigator* and expect to sell several thousand of them.

I won't be surprised if they do.

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